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ABSTRACT

The purpose of the study contained in this report is to provide research and design data for the Southwest Regional Laboratory (SWRL) Mod 2 Reading Program, a four-year program (K-3) for teaching reading skills to primary-grade children. The report is divided into two volumes. Volume one describes sequencing and methodology, and the specific rule sequences developed for the Mod 2 Reading Program; volume two lists all words (including irregularly spelled words and proper names) sequenced by and within the rules. The design of the program is based on the premise that pupil knowledge of the phoneme grapheme correspondences of English orthography and pupil ability to apply these correspondences are essential. A set of correspondence rules was developed from a 9000-word lexicon to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence. (Author/RB)

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DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM

Betty Berdiansky, George Stanton, and Bruce Cronnell

ABSTRACT

From a 9000-word lexicon, a set of spelling-to-sound correspondence rules was developed to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence.

This report is in two volumes: Volume I describes sequencing criteria and methodology, and the specific rule sequence; Volume II lists all words (including irregularly-spelled words and proper names), sequenced by and within rules.

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DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM--VOLUME II

Introduction

The design of the reading component of the Southwest Regional Laboratory's Communication Skills program is based on the premise that pupil knowledge of the spelling-to-sound correspondences of English orthography and ability to apply these correspondences is essential for success in reading words not previously introduced in instruction. To meet the design requirements implied, it was necessary to specify the spelling-to-sound correspondences for an age-graded lexicon appropriate to beginning readers, and to organize them for use in beginning reading instruction.

The spelling-to-sound correspondences were specified in Berdiansky, Cronnell, and Koehler (1963) and further elaborated in Cronnell (1971) and in the present report (see especially Volume I, Section II). These correspondences were applied to an age-graded lexicon appropriate to beginning readers (Berdiansky et al., 1969).

Criteria for organizing and sequencing these correspondences for instruction were proposed by Desberg and Cronnell (1969). The proposals were limited in that primary vowels, secondary vowels and consonants were sequenced separately and in that the sequence was not applied directly to the lexicon. The activity reported here resulted in a design for a combined sequence of correspondences for primary vowels, secondary vowels, and consonants, applied to the Berdiansky et al. (1969) lexicon.

Volume I of this report describes the criteria and methods used in designing the sequence of correspondence rules (see especially Section I). This rule sequence is described in detail in Volume I, Section II, and is summarized in Appendix C.

After the rule sequence was established, the words in the Berdiansky et al. (1969) lexicon were arranged in the sequence, such that each word was introduced as an exemplar of only one correspondence, all other

For their assistance in the preparation of this volume we wish to thank the Product Design secretarial staff, particularly Gloria Wellman, who typed (and retyped) these word lists. Richard Anguilly of Product Integration prepared and executed the sequencing of words by computer for Section II.

The volume also contains affixes, compounds, and stress patterns. For convenience, however, it is simply referred to as the rule sequence.

correspondences in the word having been previously introduced. This arrangement of words according to the rule sequence was done by hand and by computer, and is described in greater detail in Volume I, Section II.

The exemplar words for each rule (or affix, compound or stress pattern) were also sequenced for predicted ease of presentation and learning of the specific rule. The criteria for this within-rule sequencing are presented in Section I of this volume. Section II contains the actual words sequenced by rule and within rules; this establishes the design for beginning reading instruction.

Section III contains those words from the Berdiansky et al. (1969) lexicon which could not be sequenced because of irregular spelling-to-sound correspondences. Proper names from Cronnell (1969a) are sequenced in Section IV according to the rule sequence. Other words from the Berdiansky et al. (1969) lexicon which were not provided for in the rule sequence are found in Section V.

Some time after this report was completed, a careful check was made of the Berdiansky et al. (1969) lexicon to determine whether all words had been sequenced. Some errors and a number of omissions were discovered. Rather than making changes in the word lists, these words are listed in the present report as Errata and Addenda.

Appendices include a key to pronunciation and symbols, a glossary, a summary of the rule sequence, and a table listing word frequencies by year and by section of the present volume.

Section I

Criteria for Within-Rule Sequencing

The general criteria for within-rule sequencing is described in Volume I, Section I of this report. The present section details the specific criteria used in the word lists in Volume II, Section II, where exemplars of each rule are divided into a number of sections. Each section is indicated by a number or a letter or by a combination of number and letter, which rank the exemplars (lowest number and first letter with highest priority) for predicted ease of presentation and learning of a rule.

In this report, several general criteria have been most commonly used for ranking exemplars:

- 1) Position of grapheme unit: initial, final, medial, in that order of difficulty;
- 2) Number of syllables: more syllables mean greater difficulty;
- 3) Frequency: a more frequent environment offers more exemplars for presentation;
- 4) Where applicable, rule exemplars, within a section can be further subgrouped in the following order of descending preference:
 - a. exemplars containing single consonants,
 - b. exemplars containing geminate consonants,
 - c. exemplars containing digraphs (e.g., sh, ch, etc.),
 - d. exemplars containing consonant clusters;
- 5) Where applicable, rule exemplars within a section can also be further subgrouped in the following order of descending preference:
 - a. exemplars containing short vowels,
 - b. exemplars containing ee,
 - c. exemplars containing long vowels,
 - d. exemplars containing secondary vowels;
- 6) The pronunciation of the vowel(s) in an exemplar will be somewhat affected by the consonant it precedes if that consonant is r, l, or a nasal (n, m, ng).

When there is no criterion for division, or when the number of exemplars is low, words have been alphabetized. Within each section, words are also alphabetized.

In addition, three specific sets of criteria have been used with rules throughout the four-year sequence: "general position criteria," "special position criteria," and "R criteria."

General position criteria

The "general position criteria" are given below, with the underlined C or V as the grapheme unit being taught.

Consonants (one-syllable words):

1a = <u>CV</u>	2a = <u>VC</u>	3a = <u>CVCC</u>	4a = <u>CCV(C)</u>	5a = <u>CCV(C)</u>
1b = <u>CVC</u>	2b = <u>CVC</u>	3b = <u>CCVC</u>	4b = <u>(C)VCC</u>	5b = <u>(C)VCC</u>
			4c = <u>CCVCC</u>	5c = <u>CCVCC</u>
			4d = <u>CCVCC</u>	5d = <u>CCVCC</u>
				5e = <u>CCCV..</u> or <u>..VCCC</u>

Vowels (one-syllable words):

1a = <u>V</u>	2a = <u>CV</u>	3a = <u>VCC</u>	4a = <u>CVCC</u>	5a = <u>CCVCC</u>
1b = <u>VC</u>	2b = <u>CVC</u>	3b = <u>CCV</u>	4b = <u>CCVC</u>	5b = <u>CCCV..</u> or <u>..VCCC</u>

Consonants and vowels (multisyllable words):

6a = two-syllable compounds
 6b = two-syllable words formed by adding affixes to one-syllable words

7 = two-syllable words
 a = grapheme unit initial
 b = grapheme unit final
 c = grapheme unit medial

8a = three-syllable compounds
 8b = three-syllable words formed by adding affixes to two-syllable words

9 = three-syllable words
 a = grapheme unit initial
 b = grapheme unit final
 c = grapheme unit medial

10a = four-syllable compounds
 10b = four-syllable words formed by adding affixes to three-syllable words

For explanation of the symbols and terms used in this report, see Appendices A and B.

When the "general position criteria" are used, final silent e is treated as a C unless otherwise noted, since the criteria do not provide for two vowels in a word. When all words involved have a final silent e (e.g., in Block 6), it is excluded, since it does not differentiate words.

In the "general position criteria" and in other within-rule sequencing criteria, double consonants and consonant digraphs are counted as single C's; e.g., mat, mass, and mash are all considered to be CVC words. Also, secondary vowels are counted single V's, e.g., bet, beat, and beet are considered to be CVC words.

Special position criteria

The "special position criteria" are a modification of the "general position criteria" for vowels, with criteria collapsed, used in a few cases:

- i = ?(C)V...
- ii = ?(C)CCV...
- iii = two-syllable compounds:
two-syllable words formed by adding affixes to one-syllable words
- iv = other two-syllable words

R criteria

The "R criteria" are used in addition to other criteria for vowels before r, because of the greater difficulty of Vr sequences:

- i = vowel not in the environment /__r
- ii = vowel in the environment /__r

Criteria for Within-Pule Sequencing of First- and Second-Year Word Lists

Blocks 1-4		general position criteria
Block 5		
5,1		alphabetical
5,5		general position criteria
Block 6		general position criteria, with final silent <u>e</u> excluded (e.g., <u>name</u> = CVC); R criteria
Block 7		
7,1		general position criteria, with final silent <u>e</u> excluded (e.g., <u>face</u> = CVC)
Block 8		
8,1		1 = vowel Rule 11 at end of compound 2 = vowel Rule 11 in first part of compound 3 = other
8,2	A16, I16 U16, E16	1 = / <u> </u> 2 = other
	016	1 = /# <u> </u> 2 = <u>con</u> - 3 = other

In 1;1, these criteria were modified because of the introduction of five rules at once:

- 1 = VC
- 2 = CVC
- 3 = (C)VCC

Block 9

- 9,1 general position criteria, with r as part of the vowel (e.g., or = V)
- 9,2 E21
- 1 = base + er
a = $\overline{CC} + \underline{er}$
b = C + Cer
 - 2 = unstressed final er
a = $\left\{ \begin{array}{l} VCer \\ CCer \end{array} \right\}$
b = C C_ier
 - 3 = Cer
 - 4 = secondary stressed er(C):
- U21, 121, 221
- 1 = compounds
 - 2 = other
- U21
- 1 = compounds
 - 2 = er
 - 3 = other
- 9,3 general position criteria, with r as part of the vowel (e.g., word = CVC)

Block 10

- 10,1 117
- 1 = ish
 - 2 = iC
 - 3 = CC
- U17
- 1 = us
 - 2 = other
- E17
- 1 = base + ness/less
a = -ness
b = -less
 - 2 = base + en/ed
a = -en
b = -ed
 - 3 = other words with ess, en, ed

The notation C C indicates two different consonant letters, while C C indicates two occurrences of the same letter.

a = ess
 b = en
 c = ed
 4 = et
 5 = el
 6 = other

A17
 1 = -man
 2 = a
 3 = al
 4 = other (not / r)
 5 = ar(C)
 a = ar
 b = arC

017
 1 = on
 2 = other (not / r)
 3 = or(C)

10,2 Y17
 1 = base + ly
 2 = base + y
 a = $\frac{CCY}{VC} + y$
 b = $C + Cy$
 3 = numbers
 4 = other
 a = $C_1 C_1 y$
 b = $\left\{ \begin{matrix} VC \\ C_1 C \end{matrix} \right\} y$

LE22
 1 = $C_1 C_1 le$
 2 = $\left\{ \begin{matrix} VC \\ C_1 C \end{matrix} \right\} le$

10,3 alphabetical

10,4 116
 1 = in-
 2 = dis-
 3 = other

U16
 1 = un + base
 2 = other

A16, 016, E21, 021, EE10

alphabetical

- 10,5 A17 1 = a + basé
2 = a
3 = other
- E17 1 = ex-
2 = e
3 = other
- G17 1 = con-
2 = com- and col-
3 = pro-
4 = other (not / r)
5 = -Cor
- G17, 117 alphabetical

Block 11

- 11,1 1 = base + ing
2 = -ing#
3 = other
- 11,2 general position criteria
- 11,3 general position criteria
- 11,4 general position criteria
- 11,5 GG10 1 = one-syllable words; compounds
2 = other two-syllable words
- CC10 alphabetical
- 11,6 1 = one-syllable words
2 = nger#
3 = other two-syllable words

Block 12

- 12,1 general position criteria

- 12,2 EA11
- 1 = environments applying to EA11, but not to EA31
 - a = /_#
 - b = /_l
 - c = /_m
 - d = /_ch
 - e = /_p
 - f = other
 - 2 = environments applying primarily to EA11, but also to EA31 (and/or EA33 and/or EA40)
 - a = /_r
 - b = /_t
 - c = /_k
 - d = /_n
 - e = /_st
 - 3 = environments applying fairly equally to EA11 and EA31
 - a = /_d
 - b = /_f
 - c = /_v
 - d = /_th
 plus special position criteria
- EA31
- 1 = /_lth (environments applying to EA31, but not to EA11)
 - 3 = environments applying fairly equally to EA31 and EA11
 - a = /_d
 - b = /_r
 - c = other
 plus special position criteria
- 12,3 0011
- 1 = environments applying to 0011, but not to 0012
 - a = /_j
 - b = /_n

In both 12,2 and 12,3 (and similarly in 13,3; Rule 024) there are two rules for two different pronunciations of the same secondary vowel, and the following criteria are used:

- 1 = environments applying to the rule under consideration, but not the other rule;
- 2 = environments applying primarily to the rule under consideration, but also to the other rule;
- 3 = environments applying fairly equally to both rules.

c = / m
d = / p
e = / th
f = / st
2 = / l (environment applying primarily to 0011, but also to 0012)
3 = environments applying fairly equally to 0011 and 0012
a = / t
b = / d
c = / f
d = / r
e = / k
plus special position criteria

0012 2 = / k (environment applying primarily to 0012, but also to 0011)
3 = environments applying fairly equally to 0012 and 0011
a = / d
b = / t
c = / l
d = / f
e = / p
plus special position criteria

12,4 general position criteria

Block 13

13,1 031 general position criteria

031 1 = one-syllable words
2 = base + ful
3 = other two-syllable words

13,2 A23 1 = / ll
2 = / lt
3 = / ld
plus special position criteria

023 1 = / ll
2 = / ld
3 = / lt
plus special position criteria

13,3 122 1 = / nd
2 = / ld
plus special position criteria

024'

1 = environments applying to 024, but not to any other rules for o

a = / ng

b = / g

c = / ff

d = / ft

e = / nk

3 = environments applying to 024 and also to other rules for o

a = / ss

b = / st

c = / th

plus special position criteria

Block 14

14,1

1 = dge(#)

a = one-syllable words

b = compounds

c = two-syllable words

2 = nCe#

a = nge#

b = nCe#

c = nse#

i = one-syllable words

ii = two-syllable words

3 = lCe

4 = other

a = one-syllable words

b = two-syllable words

14,2

1 = rse#

2 = rve#

3 = rge#

14,3

1 = nCe#

2 = Vge#

3 = Vce#

4 = other VCe#

5 = other VCCe#

Criteria for Within File Sequencing of End-Year Words List

Block 15

- 15,1 alphabetical
15,2 general position criteria

Block 16

- 16,1 general position criteria; R criteria
16,2 general position criteria; R criteria
16,3 UE10
1 = one-syllable words
2 = two-syllable words
0x10 general position criteria; R criteria
16,4 general position criteria
16,5 general position criteria
16,6 UE10
UE10
1 = one-syllable words
2 = compounds
3 = two-syllable words
EW10 general position criteria

Block 17

- 17,1 alphabetical
17,2 -er
1 = VII, le + er
2 = other VCle + er
3 = le (LE22) + er
4 = y lav + le + er
-en alphabetical
-ing
1 = VII, le + ing
2 = other
-y
1 = VII, le + y
2 = other

- 1 = s → [z], [s]
 a = one-syllable words
 b = compounds
 c = two-syllable words
 d = f (singular) → v (plural)
 2 = (e)s → [əz]
 3 = y → i + es

-ed

- 1 = C+(C)ed
 a = [d], [t]
 i = one-syllable words
 ii = two-syllable words
 b = [əd]
 2 = CVe+ed i i
 a = [d], [t]
 i = one-syllable words
 ii = two-syllable words
 b = [əd]

- 3 = y → i + ed

17,3

-er

- 1 = two-syllable base + er
 a = no change in base
 b = e
 2 = compounds
 a = no change in base word
 b = e

-en, -ing, alphabetical
-ed

-ly

- 1 = no change in base
 2 = y [i] → i [ə] + ly
 3 = ful + ly

Block 18

18,1

E13

- 1 = re-
 2 = be-
 3 = de-
 4 = e-
 5 = pre-
 6 = other two-syllable words
 7 = three-syllable words

013

- 1 = o
 2 = pro-
 3 = co-
 4 = (co-
 5 = three-syllable words

A13 1 = two-syllable words
2 = three-syllable words

113 1 = i-
2 = i-
3 = ii-
4 = three-syllable words

U13 1 = (C)u-
2 = uu-
3 = three-syllable words
plus R criteria

18,2 S20 general position criteria; final silent e
excluded (e.g., nose = CVC)

S21 1 = -ouse
a = one-syllable words
b = two- and three-syllable words
2 = -ase
a = one-syllable words
b = two- and three-syllable words
3 = -ease
4 = -oose

18,3 1 = arV
2 = arrV
3 = other

18,4 1 = one-syllable words
2 = two-syllable words; first syllable
stressed with a vowel 13 rule
3 = two-syllable words; first syllable
stressed with other vowel rule
4 = two-syllable words; second syllable
stressed

Block 19

19,1 -ment 1 = base + ment
2 = other

-or 1 = no change in base
2 = z

-ive 1 = no change in base
2 = changes in base

-ness 1 = no change in base
2 = y → i + ness

	-ance/-ant	1 = no change in base 2 = changes in base 3 = other
19,2	IE11	1 = one-syllable words 2 = two-syllable words
	124 + GH10	general position criteria, with <u>gh</u> as part of the vowel (i.e., <u>igh</u> = V)
	GH10	1 = <u>gh</u> # 2 = <u>ght</u> # 3 = two- and three-syllable words
	H20	1 = <u>h</u> → <u>Ø</u> / # 2 = <u>h</u> → <u>Ø</u> / # 3 = <u>h</u> → <u>Ø</u> / <u>V</u> unstressed
19,3	K20	general position criteria, with <u>kn</u> as a consonant (e.g., <u>knit</u> = CVC)
	G20	1 = # <u>gn</u> 2 = <u>gn</u> # a = <u>ign</u> (Rule 122) b = other
	W20	general position criteria, with <u>wr</u> as a consonant (e.g., <u>wring</u> = CVC)
19,4		general position criteria, with <u>mb</u> as a consonant (e.g., <u>lamb</u> = CVC)
19,5	L20	1 = <u>-alk</u> (Rule A23) a = one-syllable words b = two-syllable words 2 = <u>-olk</u> (Rule 023) 3 = <u>-alf</u> 4 = <u>-alv</u> 5 = <u>-alm</u>
	T20	1 = <u>-stle</u> 2 = <u>-sten</u> 3 = <u>-ften</u>
19,6		1 = one-syllable words 2 = two-syllable words
Block 20		
20,1	-y	1 = no change in base 2 = <u>y</u> 3 = other

- ful alphabetical
- al 1 = no change in base
2 =
- able 1 = no change in base
2 = (optional)
- eth, -less, alphabetical
- ist, -ish

20,2 general position criteria

20,3 1 = -ther
a = two-syllable words
b = three-syllable words
2 = -thern
3 = -the

20,4 1 = two-syllable words
2 = three-syllable words

Block 21

21,1 alphabetical

21,2 1 = two-syllable words
2 = three-syllable words, no changes
a = base + ion
b = other
3 = + ion
4 = base + ation
a = no change in base
b =
5 = miscellaneous changes in base
6 = tion + al
7 = tion → [Con]/s__

21,3 -sion → [ʃon]

1 = -ssion
a = two-syllable words
b = three-syllable words
i = no change in base
ii = t + ion → ssion
iii = other
2 = -sion/C__
a = two-syllable words
b = three-syllable words

-sion → [ʃən]

- 1 = /V__
- 2 = /r__
- 3 = de + ion → sion
- a = V → [V] / __^{de}_{sion}
- b = V → [V̥] / __^{de}_{sion}
→ [V] / ___{sion}

21,4

- 1 = two-syllable words
- 2 = three-syllable words

Block 22

22,1

- 1 = V11,Ce#
a = first vowel: vowel 16 rule
b = first vowel: other vowel rule
- 2 = Y19#
- 3 = V15,C(C)(e)#
- 4 = other

22,2

- 1 = Y17#
- 2 = LE22#
- 3 = V17,l#
- 4 = V17,r# or E21,r#
- 5 = A17#
- 6 = V17,C#
- 7 = V17,CC#
- 8 = V17,C(C)e#

22,3

- 1 = A17#
- 2 = V17,r# or E21,r#
- 3 = O25#
- 4 = V17,C(C)#
- 5 = V17,l# or LE22#
- 6 = other

22,4

- 1 = EE10,(C)#
- 2 = other

Criteria for Within-Rule Sequencing of Fourth-Year Word List

Block 23

- 23,1 A29
- 1 = -aste#
a = base words
b = derived words and compounds
 - 2 = -ange# (including derived forms)
 - 3 = -ange...
- A24
- 1 = wa... (one-syllable words)
 - 2 = #swa... (one-syllable words)
 - 3 = #(s)wa (derived words and compounds)
 - 4 = #(s)wa... (other two- and three-syllable words)
 - 5 = #(s)qua...
- 23,2 135
- 1 = / #
a = one-syllable words
b = two- and three-syllable words
 - 2 = -ine#
 - 3 = other
- 125
- 1 = -ion
 - 2 = -ior
 - 3 = -ia
 - 4 = view
 - 5 = other
- 23,3 alphabetical

Block 24

- 24,1 four-syllable compounds,
-ing, -y, -er, -or, -en, -ed
- alphabetical
- ly
- 1 = base + ly
 - 2 = ful + ly
- 24,2
- 1 = / x
a = two-syllable words
b = three-syllable words
 - 2 = / v
a = one- and two-syllable words
b = three-syllable words
c = four-syllable words

24,3

- 1 = / C ic
a = two-syllable words (plus affixes)
b = three- and four-syllable words
- 2 = / C it
a = two-syllable words (plus affixes)
b = three-syllable words
- 3 = / C ish
- 4 = / C id

24,4

- 1 = base + ity
- 2 = ~~e~~
- 3 = other

Block 25

25,1

- 1 = base + ion
a = no change in base
b = ~~e~~
- 2 = -ation
a = no change in base
b = ~~e~~
- 3 = ~~e~~ + ition ['iʃən]
- 4 = miscellaneous changes
- 5 = first vowel: [V] in base → [Ṽ] in affixed form (with various changes)
- 6 = other

25,2

126

- 1 = two-syllable words
a = Ci
b = CCi
- 2 = three-syllable words
a = compounds; affixed words
b = other

Y26

alphabetical

U26

- 1 = two-syllable words
- 2 = three-syllable words

E26

- 1 = two-syllable words
- 2 = three-syllable words

A26, 026

alphabetical

25,3

136

- 1 = two-syllable words
- 2 = -io
- 3 = -ium
- 4 = other three-syllable words
- 5 = four-syllable words

Y36 alphabetical

25,4 A12 1 = two-syllable words
2 = three- and four-syllable words

I12, Y12, O12, U12

alphabetical

25,5 E14 1 = re-
2 = other

I14, Y14, A14, O14, U14

alphabetical

Block 26

26,1 -able 1 = no change
2 = ce no change
3 = e
4 = y → i (ay)

-ment alphabetical

-al 1 = no palatalizations
2 = palatalizations

-ness, -ary, -ist
alphabetical

26,2 IE17 1 = base + ie
2 = other

EY17 1 = base + ey
2 = other two-syllable words
3 = three- and four-syllable words

26,3 alphabetical

26,4 general position criteria, with r as part of V (i.e., ear = V)

26,5 general position criteria

26,6 EY10 general position criteria

E120 1 = eigh (one-syllable)
2 = eight (one-syllable)

3 = other one-syllable words

4 = affixed forms and two- and three-syllable words

26,7 -ous

1 = base + ous

2 = ✓

3 = y → i + ous

4 = er → i + ous

5 = non-base

6 = -ous + suffix

0031

general position criteria

0035

general position criteria; R criteria

0033

general position criteria; R criteria

0034

general position criteria, with gh as part of V (i.e., ough = V)

26,6

general position criteria

Block 27

27,1

an-

1 = -ed

2 = other

in-, mis-, ins-

alphabetical

27,2

Stress pattern 4A

1 = ia(C)(e)

a = ia

b = ial-

c = other

2 = e ua

3 = Vr(y)

a = ior

b = Vr-

c = Vry-

4 = Y17

5 = -ence/-ent

6 = Vole

7 = other

Stress pattern 4B

1 = -ate

2 = other

- 27,3 1 = -ic
 2 = other
- 27,4 1 = -ary
 2 = other
- 27,5 alphabetical
- 27,6 1 = three-syllables → two-syllables
 a = -ery
 b = -erence/-erent
 c = -ing
 d = other
 2 = three-syllables → two-syllables + affix
 3 = four-syllables → three-syllables
- 032 1 = three-syllables → two-syllables
 a = -ory
 b = other
 2 = four-syllables → three-syllables
 3 = five-syllables → four-syllables
- A32, 152 1 = three-syllables → two-syllables
 2 = four-syllables → three-syllables

Section II

Sequenced Word Lists

First-Year Word List

Frequency = .796

Block 1 Frequency = 315

1,1 Frequency = 10

N10, NN10, T10, A15, I15 Frequency = 10

<u>1</u>	an	at	in	inn	it
<u>2</u>	tan	tat	tin		
<u>3</u>	ant	tint			

1,2 Frequency = 11

P10 Frequency = 11

<u>1b</u>	pan	pat	pin	pip	pit
<u>2b</u>	nap	nip	tap	tip	
<u>3a</u>	pant				
<u>5b</u>	apt				

1,3 Frequency = 40

L10 Frequency = 7

<u>1b</u>	lap	lip	lit
<u>2b</u>	pal		
<u>3a</u>	lint		
<u>5a</u>	p'an		
<u>5c</u>	plant		

LL10 Frequency = 3

<u>2a</u>	ill	
<u>2b</u>	nill	till

1,3 (con't) S10 Frequency = 27

<u>1b</u>	sap	sat	sill	sin	sip
	sit				
<u>4a</u>	slap	slat	slip	slit	snap
	snip	span	spat	spill	spin
	spit	still			
<u>4b</u>	its	taps			
<u>4c</u>	slant				
<u>5b</u>	last	lisp	list	past	
<u>5e</u>	pants	split			

SS10 Frequency = 3

<u>2a</u>	ass	
<u>2b</u>	lass	pass

1,4 Frequency = 47

D10 Frequency = 14

<u>1b</u>	dad	did	dill	din	dip
<u>2b</u>	lad	lid	pad	sad	
<u>3b</u>	slid				
<u>4b</u>	and	land	sand		
<u>4c</u>	stand				

DD10 Frequency = 1

<u>2b</u>	add
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1,4 (con't) E15 Frequency = 32

<u>2b</u>	dell	den	led	less	let
	net	pen	pep	pet	sell
	set	tell	ten		
<u>3a</u>	end				
<u>4a</u>	dent	lend	nest	pelt	pent
	pest	send	sent	tend	tent
	test				
<u>4b</u>	sled	sped	spell	step	
<u>5a</u>	slept	spend	spent		

1,5 Frequency = 101

M10 Frequency = 32

<u>1b</u>	mad	man	map	mass	mat
	men	mess	met	mill	miss
	mitt				
<u>2a</u>	am				
<u>2b</u>	dam	dim	tam		
<u>3a</u>	mast	melt	mend	mist	
<u>3b</u>	slam	slim	stem		
<u>4b</u>	elm				
<u>5a</u>	smell				
<u>5b</u>	damp	imp	lamp	limp	
<u>5c</u>	smelt				
<u>5d</u>	stamp				
<u>5e</u>	midst				
<u>6a</u>	tom-tom				

1,5 (con't) B10 Frequency = 28

<u>1b</u>	bad	ban	bass	bat	bed
	bell	bet	bib	bid	bill
	bin	bit			
<u>2b</u>	dab	tab			
<u>3a</u>	band	belt	bend	bent	best
<u>3b</u>	slab	stab			
<u>4a</u>	blab	bled	bless	bliss	
<u>4c</u>	blast	blend	blimp		

U15 Frequency = 41

<u>1b</u>	up	us			
<u>2b</u>	bud	bum	bun	bus	but
	butt	dull	mud	mum	muss
	nut	pun	pup	sub	sum
	sun	sup	tub	tut	
<u>3a</u>	ups				
<u>4a</u>	bull	bump	bust	dump	dust
	lump	lust	must	pump	
<u>4b</u>	plum	plus	slum	spun	stuh
	stun				
<u>5a</u>	plump	stump	stunt		
<u>5c</u>	mumps				

1,6 Frequency = 106

R10 Frequency = 45

<u>1b</u>	ram	ran	rap	rat	red
	rib	rid	rim	rip	rub
	rum	run	rut		
<u>3a</u>	rend	rent	rest	rump	runt
	rust				
<u>5a</u>	brad	bran	brass	brat	dress
	drill	drip	drum	press	prim
	trap	trill	trim	trip	
<u>5c</u>	brand	primp	print	tramp	trump
	trust				
<u>5e</u>	strand	strap	strip	strum	strut
<u>6a</u>	rat-tat				

H10 Frequency = 22

<u>1b</u>	had	ham	hat	hell	hem
	hen	hid	hill	him	hip
	hit	hub	hull	hum	hut
<u>3a</u>	hand	held	help	hemp	hint
	hump	hunt			

1,6 (con't) 015 Frequency = 39

<u>1b</u>	odd	on			
<u>2b</u>	bob	doll	dot	hop	hot
	lot	mob	mom	mop	nod
	not	pod	pop	pot	rob
	rod	rot	sob	sod	sop
	top	tot			
<u>4a</u>	bond	pond	romp		
<u>4b</u>	blot	drop	plod	plot	prop
	slop	slot	spot	stop	trot
<u>5a</u>	blond				
<u>5e</u>	prompt				

Block 2 Frequency = 50

2,1 Frequency = 28

SH10 Frequency = 28

1b sham shed shell shin ship

shot shut

2a ash

2b dash dish hash hush lash

mash mush rush sash

3a shalt

3b blush brush slush smash trash

4a shred shrill shrub

4c shrimp

5e splash

2,2 Frequency = 22

TH13 Frequency = 6

1b than that them then this

thus

TH11 Frequency = 16

1b thud thin

2b bath hath lath math path

pith

3a thump

4a thrash thresh thrill thrush

4b depth tenth

4c thrust

Block 3 Frequency = 51

3,1 Frequency = 40

EE10 Frequency = 36

1b eel

2a bee see tee thee

2b beer beet deed deep deer

 heed heel meet need peel

 peep peer reed reel seed

 seem seen seep sheep sheet

 teeth

3b three tree

4b bleed sleep sleet speed steel

 steep steer

5e street

E25 Frequency = 4

2a be he me she

3,2 Frequency = 11

Y19 Frequency = 11

2a by my shy thy

3b dry pry sly spy sty

 try

6a by-by

Block 4

Frequency = 380

4,1

Frequency = 91

F10 Frequency = 51

1a fee

1b fad fan fat fed feed

feel feet fell fib fill

fin fish fit fun fuss

2a if

2b beef

3a fast felt fifth film fist

fond

4a flap flash flat fied flee

fleet flesh flip flop fly

free fresh fret fry

4b elf self shelf

4c flint

5b left lift raft shaft shift

sift

5d draft drift thrift

FF10 Frequency = 9

2b buff huff muff puff

3b fluff sniff staff stiff stuff

4,1 (con't) W10 Frequency = 31

<u>1a</u>	wee	wee			
<u>1b</u>	web	wed	weed	weep	well
	wet	will	win	wish	wit
	with				
<u>3a</u>	went	wept	west	wilt	
<u>5a</u>	dwelt	sweep	sweet	swell	swill
	swim	swish	tweed	tweet	twin
<u>5c</u>	swept	swift	twist		
<u>5e</u>	twelfth				

4,2 Frequency = 187

K10 Frequency = 37

<u>1b</u>	keen	keep	kid	kill	kin
	kiss	kit			
<u>2b</u>	leek	meek	peek	reek	seek
	week				
<u>3a</u>	kelp	kept			
<u>4b</u>	ask	bask	desk	disk	dusk
	elk	husk	mask	milk	risk
	silk	sulk	task	tusk	
<u>5a</u>	skid	skill	skim	skin	skip
	skit	skull	sky		

4,2 (con't) N20 Frequency = 34

<u>5b</u>	bank	bunk	hunk,	ink	kink
	link	mink	pink	punk	rark
	rink	sank	sink	sunk	tank
	thank	think	wink		
<u>5d</u>	blank	blink	brink	drank	drink
	drunk	frank	plank	prank	shrink
	shrunk	skunk	slink	spank	stink
	trunk				

C12 Frequency = 59

<u>1b</u>	cab	cad	can	cap	cash
	cat	cob	cod	cop	cot
	cub	cud	cuff	cup	cuss
	cut				
<u>3a</u>	camp	cast			
<u>4a</u>	clad	clam	clan	clap	class
	cliff	clip	clod	club	crab
	cram	crash	creed	creek	creep
	crib	crop	crush	cry	
<u>4c</u>	clamp	clasp	clump	craft	cramp
	crank	crept	crest	crisp	crust
<u>5a</u>	scab	scat			
<u>5b</u>	act	fact			
<u>5c</u>	scalp	scamp	scant		
<u>5d</u>	tract				
<u>5e</u>	scrap	screen	scrub	strict	

4,2 (con't) CK10 Frequency = 57

<u>2b</u>	back	beck	buck	cock	deck
	dock	duck	hack	heck	kick
	lack	lick	lock	luck	neck
	nack	nack	peck	pick	rack
	rock	sack	shack	shock	shuck
	sick	sock	suck	tack	thick
	tick	tuck	wick		
<u>3b</u>	black	block	brick	click	cluck
	cluck	crack	flock	frock	pluck
	prick	slack	slick	smack	snock
	spect	stack	stick	stock	stuck
	track	trick	truck		
<u>5c</u>	struck				

4.3 Frequency = 65

G12 Frequency = 65

1b gag gap gas gash god

got gum gun

2b bag beg big bug dig

dug fig hag hug leg

lag leg lug mug nag

peg pig pug rag rig

rug sag tag tug wag

wig

3a gasp gulf gulp

3b crag drag drug flag plug

slag slug snag stag twig

4a glad glass glee glen grab

grass greed green greet grill

grin grip grit grub gruff

4c grand grant grunt

4,4 Frequency = 32

J10 Frequency = 12

<u>1b</u>	jack	jam	jell	jet	jig
	job	jot	jug		
<u>3a</u>	jest	jump	junk	rust	

X10 Frequency = 14

<u>2a</u>	ax	ox			
<u>2b</u>	box	fix	fox	mix	rex
	six	sox	tax	wax	
<u>3b</u>	flax				
<u>5b</u>	next	sixth			

Y10 Frequency = 6

<u>1a</u>	ye				
<u>1b</u>	yak	yap	yell	yes	yet

4,5 Frequency = 5

V10 Frequency = 2

<u>1b</u>	van
<u>3a</u>	vest

Z10 Frequency = 2

<u>3a</u>	zinc
<u>6a</u>	zid-zad

ZZ10 Frequency = 1

<u>3b</u>	buzz
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Second-Year Word List

Frequency = 2299

Block 5 Frequency = 68

5.1 Frequency = 36

Compounds Frequency = 36

bathtub	blacksmith	bobsled	cannot
catfish	catnip	chopstick	deerskin
fishpond	flagship	flashbulb	grandstand
gumdrop	hotbed	inkstand	inkwell
inland (P)	instep	lipstick	lockbox
milkman	milkweed	padlock	pickup
pigpen	sandbag	sandman	sheepman
shellfish	shotgun	sunset	teepee
tomcat	uphill	upset (N)	weekend

5.2

The -ing suffix with previously introduced base words.

5.3

The -es suffix (plurals and third-person singular, present tense forms) with previously introduced base words.

5.4

The -ed suffix (past tense) with previously introduced base words.

5,5 Frequency = 32

NG10 Frequency = 32

<u>2b</u>	bang	ding	fang	gang
	hang	hung	king	iung
	rang	ring	rung	sang
	sing	sung	thing	wing
<u>3b</u>	bring	clang	cling	fling
	slang	sling	slung	sting
	stung	swing	swung	
<u>5e</u>	sprang	spring	sprung	string
	strung			

Block 6 Frequency = 259

6,1 Frequency = 176

All Frequency = 108

<u>1bi</u>	ale	ape	ate	
<u>2bi</u>	babe	bade	bake	bale
	cake	came	cane	cape
	cave	dame	date	fade
	fake	fame	fate	gale
	game	gate	gave	hate
	lake	lame	lane	late
	made	make	male	mane
	mate	name	pale	pane
	pave	rake	rate	rave
	safe	sake	sale	same
	sane	save	shade	shake
	shame	shape	shave	take
	tale	tame	tape	vane
	wade	wake	wane	wave
<u>2bii</u>	bare	care	dare	fare
	hare	mare	pare	rare
	share	ware		
<u>4bi</u>	blade	blame	blaze	brake
	brave	crane	crate	crave
	craze	drake	drape	flake
	flame	frame	glade	grade
	grape	grate	grave	graze

6,1 (con't)

plane	plate	scale	skate
slate	slave	snake	spade
spake	stake	stale	state
stave	trade		
<u>4bii</u> glare	scare	snare	spare
stare			

III Frequency = 68

<u>2bi</u> bike	bite	dike	dime
dine	dive	fife	fine
five	hide	hike	hive
kite	life	like	lime
line	live (Aj)	mile	mine
mite	nine	pile	pine
pipe	ride	rime	ripe
rite	shine	side	site
size	tide	tile	time
vine	wide	wife	wine
wipe			

<u>2bii</u> fire	hire	mire	tire
wire			

<u>4bi</u> bride	crime	drive	glide
pride	prize	shrine	slide
slime	smile	snipe	spike
spine	spite	stile	swipe
tribe	twine		

<u>5ei</u> sprite	stride	strike	stripe
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6,2 Frequency = 83

011 Frequency = 60

1bii ore

<u>2bi</u>	bone	code	coke	cone
	dole	dome	dope	dove (Vb)
	hole	home	hope	joke
	lone	mode	mole	mope
	note	poke	pole	pope
	robe	rode	role	rope
	rove	sole	tone	vote
	woke	wove	yoke	zone

2bii bore core fore more

 shore sore tore wore

4bi broke clove drove froze

 globe grove slope smoke

 smote spoke stole stone

 stove throne

4bii score snore store swore

5bi stroke

6,2 (con't) U11 Frequency = 16

<u>2bi</u>	cube ^{''}	cute ^{''}	duke	dune
	June	more ^{''}	rude ^{''}	rule
	tube	tune		

<u>2bii</u>	cure ^{''}	pure ^{''}		
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<u>4bi</u>	crude ^{''}	flute ^{''}	lume ^{''}	prune ^{''}
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E11 Frequency = 3

<u>1bi</u>	eve
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<u>2bi</u>	theme
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<u>2bii</u>	here
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EE10 + E18 Frequency = 4

<u>4b</u>	breeze	freeze	sleeve	sneeze
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* = always pronounced [u]

.. = always pronounced [yu]

Unasterisked words may be pronounced either [u] or [yu], but [u] predominates.

Block 7 Frequency = 36

7,1 Frequency = 36

C11 Frequency = 26

1b cell

2a ace ice

2b dice face lace lice

 mice nice pace race

 rice

3a cent

3b brace fleece grace place

 price slice space spice

 thrice trace twice

5a scene

5e spruce

G11 Frequency = 10

1a gee

1b gem gin

2a age

2b cage huge page rage

 sage

3b stage

7,2 The -s, -d, and -ing suffixes added to words with general primary vowel Rule 11.

Block 8 Frequency = 70

8,1 Frequency = 45

Compounds with rules in Block 5-7 Frequency = 45

<u>1</u>	bathrobe	bedtime	beehive	campfire
	classmate	cupcake	drugstore	hillside
	inside	jump rope	keepsake	manhole
	milkshake	nickname	pancake	ragtime
	springtime	sunshine	tadpole	teenage
	upside	wishbone		
<u>2</u>	farewell	firefly	fireplace	fireside
	grapevine	herein	homemade	homesick
	icebox	iceman	limeade	limestone
	livestock	paleface	pipeline	polecat
	sagebrush	smokestack	sparerib	stovepipe
	tapeline			
<u>3</u>	gangplank	slingshot		

8,2 Frequency = 25

A16 Frequency = 7

1 abscess .accent address(N)(P) annex(N)

2 landscape sampan transplant(N)

116 Frequency = 3

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l    index    insect •
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2 picnic

U16 | Frequency = 3

1 umpire

2 muskrat suspect (N)

E16 Frequency = 2

2 reptile welfare

016 Frequency = 10

1 object(N)

2	concrete (P) (AS) conduct (N)	content (N)
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contest(N) contract(N) convent

3 bonfire compact(N) costume

Block 9 Frequency = 322

9,1 Frequency = 107

A21 Frequency = 40

<u>1b</u>	ark	arm	art	
<u>2a</u>	bar	car	far	jar
	mar	tår		
<u>2b</u>	bard	bark	barn	card
	carp	cart	dark	darn
	dart	farm	hard	hark
	harm	harp	lard	lark
	mark	marsh	park	part
	shark	sharp	tart	yard
	yarn			
<u>3b</u>	scar	star		
<u>4b</u>	scarf	smart	spark	start

021 Frequency = 26

<u>1a</u>	or			
<u>2a</u>	for	nor		
<u>2b</u>	born	cord	cork	corn
	ford	fork	form	fort
	forth	horn	lord	morn
	north	pork	port	short
	sort	thorn	torn	worn
<u>4b</u>	sport	stork	storm	

9,1 (con't) U21 Frequency = 15

1b urn

2a bur fur purr

2b burn curb curd curl

furl hurt turn

3b spur

4a burnt burst

4b slurp

121 Frequency = 14

2a fir sir

2b bird birth dirt shirt

third

3b stir

4a first thirst

4b flirt skirt swirl twirl

E21 Frequency = 12

2a her per

2b berth fern germ herd

jerk pert term verb

4b clerk stern

9,2 Frequency = 192

E21 Frequency = 150 (plus agent noun and comparative adjective forms of previously introduced words)

<u>1a</u>	banker	bumper	burner	camper
	dresser	dweller	flyer	gusher
	hanger	helper	herder	hunter
	jumper	keeper	milker	mixer
	picker	planter	printer	renter
	ringer	singer	sleeper	speller
	stinker	sweeper	thrasher	
<u>1b</u>	batter	blotter	clipper	cutter
	dipper	dropper	drummer	fibber
	flapper	gunner	potter	robber
	runner	shutter	snapper	stopper
	swimmer	thinner	trapper	winner
	zipper			
<u>2a</u>	after	amber	antler	aster
	blister	canter	center	cinder
	cluster	cracker	enter	fender
	filter	flicker	gander	ginger
	hinder	huckster	limber	lobster
	locker	lumber	master	member
	mister	monster	number	pester
	plaster	pucker	scamper	scatter
	shelter	silver	sister	slender
	slumber	splinter	sucker	teeter

9,2 (con't)

teeter-totter	temper	tender
tr under	tinter	tinker
winter	yonder	

<u>2b</u>	banner	better	bitter	bladder
	blubber	butter	copper	dinner
	flutter	fodder	gutter	hammer
	heller	inner	ladder	latter
	letter	litter	manner	matter
	millar	mutter	otter	patter
	pepper	pitter	pitter-patter	
	platter	rubber	rudder	setter
	shatter	skipper	slipper	spatter
	summer	supper	tatter	teller
	twitter	udder	upper	

3 perfume termite

4 adverb cistern concert expert
iceberg lantern pattern transfer(N)
western

U21 Frequency = 5

1 sandbur sunburn

2 burdock murmur murder

I21 Frequency = 4

1 birdseed blackbird catbird redbird

9,2 (con't) A21 Frequency = 18

<u>1</u>	backyard	barnyard	birchbark	carfare
	farmyard	graveyard	hardware	skylark
	starfish	streetcar	stockyard	yardstick
<u>2</u>	barber	farmer	garter	parker
	partner	starter		

021 Frequency = 15

<u>1</u>	cornflake	landlord	northland	popcorn
	sandstorm	shortcake	shortcut	shortstop
<u>2</u>	corner	former	order	porter
<u>3</u>	platform	torment (N)	transport (N)	

9,3 Frequency = 23

A25 Frequency = 11

<u>2a</u>	war			
<u>2b</u>	ward	warm	warn	wart
<u>4a</u>	warmth			
<u>1b</u>	dwarf	swarm		
<u>6a</u>	wardrobe	warm-up		
<u>6b</u>	warmer			

022 Frequency = 12

<u>2b</u>	word	work	worm	worth
<u>4a</u>	world	worst		
<u>6a</u>	fireworks	framework	homework	silkworm
	workshop			
<u>6b</u>	worker			

Block 10 Frequency = 575

10,1 Frequency = 213

117 Frequency = 36

<u>1</u>	furnish	greenish	publish	reddish
	rubbish	selfish	varnish	
<u>2</u>	anvil	attic	bandit	derrick
	goblin	hermit	horrid	margin
	martin	napkin	orbit	pencil
	pilgrim	public	pumpkin	rabbit
	splendid	summit	tennis	tonsil
	torrid	traffic	turnip	victim
	worship			

<u>3</u>	artist	dentist	district	florist
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117 Frequency = 6

<u>1</u>	cactus	campus	circus	fungus
<u>2</u>	album	stirrup		

10,1 (con't)E17 Frequency = 89

<u>1a</u>	darkness	gladness	illness	sadness
	sickness			
<u>1b</u>	careless	homeless		
<u>2a</u>	bitten	blacken	deepen	fatten
	flatten	harden	ridden	rotten
	sharpen	silken	sweeten	
<u>2b</u>	dotted	spotted	stranded	
<u>3a</u>	actress	harness	mattress	mistress
	princess	reckless		
<u>3b</u>	burden	garden	happen	kitten
	mitten	pollen	sudden	
<u>3c</u>	wicked			
<u>4</u>	anklet	basket	blanket	bonnet
	bracelet	bucket	carpet	casket
	cricket	goblet	jacket	locket
	magnet	mallet	market	midget
	packet	pallet	pellet	pocket
	puppet	racket	russet	scarlet
	skillet	tablet	thicket	ticket
	trumpet	velvet		
<u>5</u>	cancel	funnel	kenel	kernel
	mantel	nickel	parcel	pretzel
	tassel	tinsel	tunnel	vessel
<u>6</u>	absent	current	forest	garment
	harvest	hundred	object (N)	pavement
	perfect	problem	statement	subject (N)

10,1 (con't) A17 Frequency = 45

<u>1</u>	brakeman	busman	fireman	foremen
	freshman	hunter	workman	
<u>2</u>	comma	extra	larva	Santa
<u>3</u>	central	dental	formal	moral
	normal	oral	rascal	sandal
	signal			
<u>4</u>	bantam	canvas	errand	gallant
	German	infant	organ	pennant
	servant			
<u>5a</u>	burglar	cellar	collar	dollar
	grammar	nectar	poplar	vulgar
<u>5b</u>	backward	blizzard	custard	forward
	homeward	mustard	standard	upward

017 Frequency = 37

<u>1</u>	button	cannon	canyon	carbon
	carton	common	cotton	crimson
	gallon	lesson	mutton	pardon
	person	ribbon	sermon	
<u>2</u>	blossom	bottom	freedom	gallop
	hammock	hassock	mammoth	method
	pistol	scallop	seldom	
<u>3</u>	actor	arbor	armor	doctor
	effort	harbor	mirror	oxford
	parlor	stubborn	tractor	

10,2 Frequency = 226

Y17 Frequency = 142

<u>1</u>	badly	barely	bravely	gladly
	hardly	homely	lately	likely
	lively	lonely	manly	nicely
	partly	prickly	promptly	sadly
	safely	shapely	shortly	sweetly
	swiftly	warmly	weekly	
<u>2a</u>	billy	bumpy	creepy	curly
	dirty	dolly	dusty	fluffy
	fussy	fuzzy	greedy	hilly
	horny	inky	jelly	lucky
	messy	milky	needy	rocky
	rusty	sandy	silky	sleepy
	smarty	sticky	stormy	sulky
	tarty	thirsty	thorny	thrifty
	tricky			
<u>2b</u>	daddy	fatty	funny	furry
	mommy	muddy	puppy	skinny
	sunny	teddy	zippy	
<u>3</u>	fifty	forty	ninety	sixty
	thirty	twenty		

10,2 (con't)

4a

belly	berry	bidly	bonny
buddy	bunny	ditty	dizzy
dummy	ferry	golly	gully
gunny	happy	hobby	holly
hurry	jiffy	jolly	kitty
iobby	mammy	middy	penny
poppy	shabby	shinny	silly
sorry	stubby	tabby	taffy
tally	toddy	worry	wuzzy

4b

army	brandy	candy	cranky
dandy	derby	empty	fancy
frisky	gently	glory	grizzly
handy	hungry	husky	kinky
lanky	mercy	merry	nasty
pantry	party	perky	plenty
safety	simply	stingy	story
sturdy	tardy	teeny	ugly
wobbly			

10,2 (con't) LE22 Frequency = 84

<u>1</u>	apple	battle	bottle	bubble
	cattle	coddle	cripple	crippled
	fiddle	gobble	huddle	kettle
	little	middle	muzzle	nibble
	nipple	paddle	pebble	peddle
	puddle	puzzle	raffle	rattle
	riddle	ripple	ruffle	saddle
	scribble	settle	tattle	wabble
<u>2</u>	angle	ankle	beetle	buckle
	bundle	cackle	candle	circle
	crackle	crumble	dangle	dimple
	feeble	freckle	fumble	gargle
	gentle	grumble	handle	jingle
	jungle	kindle	mantle	marble
	needle	nimble	pickle	pimple
	purple	gumble	sample	scramble
	shingle	simple	single	sparkle
	speckle	sprinkle	steeple	stumble
	tackle	tangle	temple	thimble
	tickle	tinkle	trample	tumble
	turtle	twinkle	uncle	warble

10,3 Frequency = 8

Compounds Frequency = 8

{	herself	himself	itself	myself
	northwest	upon	upset(V,Aj)	within

10,4 Frequency = 40

116 Frequency = 14

<u>1</u>	indent	inflate	inform	insane
	inspect	intend	invent	invite
<u>2</u>	disgrace	dismiss	distress	disturb
<u>3</u>	impure	mistake		

U16 Frequency = 5

<u>1</u>	undress	unlace	unlock
<u>2</u>	unless	until	

A16 Frequency = 4

accept	pastel	transplant(Vb)	transport (Vb)
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016 Frequency = 2

stockade	trombone
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E21 Frequency = 4

percent	perfect(Vb)	perform	perhaps
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021 Frequency = 2

cornet	torment(Vb)
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EE10 Frequency = 9

indeed	fifteen	fifteenth	nineteen
nineteenth	sixteen	sixteenth	thirteen
thirtieth			

10,5 Frequency = 88

A17 Frequency = 38

<u>1</u>	aback	afar	afire	alike
	alive	alone	apart	ashore
	asleep	awake	awoke	
<u>2</u>	abode	acute	address (Vb)	admire
	admit	adopt	adult	afford
	agree	alarm	alas	alert
	amaze	annex (Vb)	apply	arrest
	arrive	assume	attack	attend
	attract			
<u>3</u>	canal	lapel	manure	parade
	salon	salute		

E17 Frequency = 19

<u>1</u>	except	excite	expect	explode
	explore	express	extend	
<u>2</u>	entire	escape		
<u>3</u>	between	cement	degree	describe
	respect	restore	secrete	sedan
	select	shellac		

10,5 (con't) 017 Frequency = 24

1 condense conduct(Vb) connect content(Aj)

contest(Vb) contract(Vb)

2 collect command commence compact(Aj,Vb)

complete

3 produce(Vb) progress(Vb) project(Vb) .promote

protect provide

4 object(Vb) o'clock polite :

5 corral correct forgot forlorn

U17 Frequency = 5

subject(Vb) subtract supply support

suspect(Vb)

117 Frequency = 2

cigar divide

Block 11 Frequency = 214

11,1 Frequency = 41

NG10 Frequency = 41

<u>1</u>	backing	being	blessing	breeding
	camping	clipping	cutting	dashing
	dresssing	drumming	ending	filling
	greeting	helping	landing	licking
	meeting	mending	packing	rocking
	setting	spelling	stuffing	tatting
	thrilling	trimming	trying	warning
	wedding	willing		
<u>2</u>	cunning	darling	duckling	dumpling
	herring	kindling	morning	shirting
	stocking			
<u>3</u>	hanqar (P)	kingdom		

11,2 Frequency = 97

CH10 Frequency = 66

<u>1b</u>	chat	check	cheek	cheer
	chess	chick	chill	chin
	chip	chop	chuck	chug
	chum			
<u>2b</u>	beech	much	rich	such
<u>3a</u>	charm	chart	chest	chime
	chink	chirp	choke	chore
	chunk	church	churn	
<u>3b</u>	speech			
<u>4b</u>	belch	bench	birch	bunch
	hunch	inch	lunch	march
	munch	perch	pinch	porch
	punch	ranch	torch	
<u>4d</u>	branch	crunch	French	starch
	trench			
<u>6a</u>	workbench			
<u>6b</u>	cheery	chilly	crunchy	rancher
<u>7a</u>	channel	chapter	chatter	checker
	cherry	chicken	children	chipmunk
	chubby			
<u>7b</u>	attach	sandwich(P)		
<u>7c</u>	merchant	orchard		
<u>10a</u>	chitter-chatter			

11,2 (con't) TCH10 Frequency = 29

<u>2a</u>	itch			
<u>2b</u>	batch	catch(P)	ditch	fetch
	hatch	hitch	latch	match
	notch	patch	pitch	thatch
	witch			
<u>3b</u>	crutch	Scotch	sketch	stitch
	switch			
<u>5e</u>	scratch	stretch		
<u>6a</u>	hopscotch			
<u>6b</u>	catcher(P)	pitcher	stretcher	
<u>7c</u>	catchup(P)	hatchet	kitchen	satchel

11,3 Frequency = 23

WH10 Frequency = 23

<u>1a</u>	why			
<u>1b</u>	whack	wheel	when	which
	whip	whiz	whizz	
<u>3a</u>	whale	wharf	while	whine
	whirl	white		
<u>6a</u>	bobwhite	whalebone		
<u>6b</u>	wheeler			
<u>7a</u>	whimper	whinny	whisker	whisky
	whisper			
<u>7c</u>	awhile			

1

11,4 Frequency = 24

QU10 Frequency = 24

<u>1b</u>	quack	queen	queer	quick
	quit	quiz		
<u>3a</u>	quake	quart	quilt	quite
	quote			
<u>5c</u>	square	squeeze	squirm	squirt
<u>6a</u>	quicksand			
<u>6b</u>	quicken	quickly		
<u>7a</u>	quarrel	quarry	quartet	quarter
<u>7c</u>	banquet	squirrel		

11,5 Frequency = 19

GG10 Frequency = 17

<u>1</u>	egg	eggplant		
<u>2</u>	baggage	beggar	buggy	dagger
	giggle	maggot	nugget	piggish
	ragged	rugged	shaggy	staggar
	waggle	wiggle	viggly	

CC12 Frequency = 2

hiccup soccer

11,6 Frequency = 10

G31 Frequency = 10

<u>1</u>	get	gift	gig	gill
	girl			
<u>2</u>	anger	finger	linger	
<u>3</u>	forget	target		

Block 12 Frequency = 476

12,1 Frequency = 49

AY10 Frequency = 49

<u>2a</u>	bay	day	gay	hay
	jay	lay	may	nay
	pay	ray	say	way
<u>3b</u>	brav	clay	gray	play
	pray	slay	stay	sway
	tray			
<u>5b</u>	spray	stray		
<u>6a</u>	ashtray	birthday	crayfish	daytime
	driveway	haycock	haystack	maybe
	pathway	playmate	plaything	runway
	week day			
<u>6b</u>	grayish	payment	player	saying
<u>7b</u>	away	display	midway	subway
	Sunday (P)			
<u>7c</u>	crayon	layer	mayor	prayer

12,2 Frequency = 184 ,

EAll Frequency = 141

<u>lai</u>	pea	sea	tea	
<u>ii</u>	flea	plea		
<u>iii</u>	peacock	peanut	seashore	seasick
	seaweed	teacup	teapot	
<u>lbi</u>	deal	heal	meal	peal
	real	seal		
<u>ii</u>	isqueal	steal		
<u>iii</u>	misdeal	really	sealskin	
<u>iv</u>	appeal	realize		
<u>lc</u>	beam	seam	team	
<u>ii</u>	cream	dream	scream	steam
	stream			
<u>iii</u>	steamer	steamship	streamer	streamline
	sunbeam	upstream		
<u>ldi</u>	beach	each	leach	peach
	reach	teach		
<u>ii</u>	preach			
<u>iii</u>	preacher	teacher	teaching	
<u>le</u>	cheap	heap	leap	reap
<u>lfi</u>	leash	peace		
<u>iv</u>	beacon	eager	eagle	

12,2 (con't)	<u>2ai</u>	dear	ear	fear	gear
		hear	near	rear	sear
		shear	tear(N)	year	
	<u>ii</u>	clear	smear	spear	
	<u>iii</u>	dearly	earring	near-by	nearly
		smeary	shearer	yearly	
	<u>iv</u>	dreary	weary		
	<u>2bi</u>	beat	cheat	feat	eat
		heat	meat	neat	peat
		seat	wheat		
	<u>ii</u>	bleat	pleat	treat	
	<u>iii</u>	beaten	beater	eaten	heater
		mincemeat	neatly	neatness	
	<u>2ci</u>	beak	leak	peak	weak
	<u>ii</u>	bleak	creak	reak	squeak
		streak			
	<u>iii</u>	leaky	squeaky		
	<u>2d</u>	bean	lean	mean	wean
	<u>ii</u>	clean			
	<u>iii</u>	beanbag	cleaner	cleanup	meaning
		meanwhile			

12,2 (con't) 2ei beast east feast least

yeast

iii northeast

iv Easter

3a bead lead(Vb) read(present tense)

iii beaded leader reading

iv beadle

3bi leaf

iii leafy

3ci leave weave

3di heath

EA31 Frequency = 43

li health wealth

iii healthy wealthy

3ai dead head lead(N) rear (past tense)

ii bread dread spread stead

thread tread

iii bedstead forehead heading homestead

instead threadbare

iv ahead ready steady

3b bear pear tear(V) wear

ii swear

iii bearskin

3ci deaf death

ii breath breast dreamt sweat

iii breastplate redbreast sweater sweaty

iv breakfast heaven heavy weapon

12,3 Frequency = 143

0011 Frequency = 89

<u>lai</u>	boo	coo	moo	too
	zoo			
<u>iv</u>	bamboo	boohoo	igloo	shampoo
	tattoo			
<u>lbi</u>	coon	loon	moon	noon
	soon			
<u>ii</u>	spoon			
<u>iii</u>	forenoon	moonbeam	noonday	noontime
	teaspoon			
<u>iv</u>	balloon	cartoon	cocoon	harpoon
	raccoon	saloon		
<u>lci</u>	boom	loom	room	
<u>ii</u>	bloom	broom	groom	
<u>iii</u>	bathroom	bedroom	bloomer	blooming
	broomstick	classroom	gloomy	lunchroom
	playroom	roommate	stateroom	storeroom
<u>ldi</u>	coop	hoop	loop	whoop
<u>ii</u>	droop	scoop	stoop	swoop
	troop			
<u>lei</u>	booth	tooth		
<u>iii</u>	toothbrush	toothpick		
<u>lfi</u>	boost	roost		
<u>iv</u>	rooster			

12,3 (con't)	<u>2i</u>	cool	fool	pool	tool
	<u>ii</u>	spool	stool		
	<u>iii</u>	cooler	foolish	toolbox	
	<u>3aii</u>	boot	hoot	loot	root
		shoot	toot		
	<u>iii</u>	shooter			
	<u>iv</u>	bootee	scooter		
	<u>3bi</u>	food	mood		
	<u>ii</u>	brood			
	<u>iv</u>	poodle			
	<u>3ci</u>	roof			
	<u>ii</u>	proof			
	<u>iii</u>	fireproof			
	<u>3di</u>	moor	poor		
	<u>3eiv</u>	spooky			

12,3 (con't) 0012 Frequency = 54

<u>2i</u>	book	cook	hook	look
	looks	nook	rook	shook
	took			
<u>ii</u>	brook	crook		
<u>iii</u>	bookman	cookbook	cooker	cooky
	crooked	fishhook	hooky	notebook
	scrapbook	textbook	unhook	
<u>iv</u>	booklet			
<u>3ai</u>	good	hood	wood	
<u>ii</u>	stood			
<u>ii</u>	driftwood	firewood	good-by	goodness
	goodwill	goody	manhood	redwood,
	woodchuck	wooded	wooden	woodland
	woodpile	woodshed	woodwork	woody
<u>3bi</u>	foot	spot		
<u>iii</u>	barefoot	footstep		
<u>iv</u>	afoot-			
<u>3ci</u>	wool			
<u>iii</u>	woolen	woolly		
<u>3di</u>	hoof	woof		
<u>3civ</u>	whoopie			

12,4 Frequency = 102

OW11 Frequency = 59

<u>1b</u>	owe	own		
<u>2a</u>	bow(N)	low	mow(Vb)	row(Vb, N)
	show	sow(Vb)	tow	
<u>2b</u>	bowl	shown	sown	
<u>3b</u>	blow	crow	flow	glow
	grow	slow	snow	stow
	throw			
<u>4b</u>	blown	flown	grown	thrown
<u>6a</u>	grownup	scarecrow	showman	slowpoke
	snowbank	snowbird	snowdrift	snowdrop
	snowflake	snowman	snowstorm	
<u>6b</u>	bowling	grower	lowly	owner
	slowly	snowy		
<u>7b</u>	bellow	borrow	elbow	fellow
	follow	furrow	hollow	meadow
	mellow	minnow	morrow	pillow
	sorrow	tallow	willow	window
	yellow			

12,4 (con't) OW12 Frequency = 43

1a ow

1b owl

2a bow(Vb, N) chow cow how
mow(N) now row(N) sow(N)
wow

2b down fowl gown howl
town

3b brow plow

4b brown clown crowd crown
drown frown growl

6a howwow downtown somehow uptown

6b brownish downy downward

7b allow

7c bowel bower coward flower
howdy powder power shower
tower vowel

Block 13 Frequency = 197

13,1 Frequency = 73

031 Frequency = 38

<u>2b</u>	son	ton	won	
<u>4a</u>	come	done	dove (N)	love
	month	none	shove	some
<u>4b</u>	from			
<u>5a</u>	front	glove		
<u>6a</u>	frontward	grandson	lonesome	someday
	something	sometime	tiresome	
<u>6b</u>	lovely	sonny	undone	
<u>7a</u>	oven			
<u>7c</u>	above	among	color	compass
	cover	dozen	govern	income (P)
	Monday (P)	nothing	shovel	welcome
	worder			

031 Frequency = 35

<u>1</u>	bull	bush	full	pull
	push	puss	put	
<u>2</u>	armful	bashful	careful	cheerful
	cupful	dreadful	graceful	grateful
	handful	harmful	hateful	healthful
	helpful	peaceful	playful	skillful
	spoonful	thankful		
<u>3</u>	bullet	bully	bushel	bushy
	butcher	fullback	pudding	pullman
	pulpit	pussy		

13,2 Frequency = 52

A23 Frequency = 26

<u>li</u>	all	ball	call	fall
	gall	hall	tall	wall
<u>ii</u>	small	stall		
<u>iii</u>	baseball	fallen	football	hallway
	smallpox	snowball	snowfall	
<u>2i</u>	halt	malt	salt	
<u>iii</u>	halter	malting	salty	
<u>iv</u>	altar			
<u>3i</u>	bald			
<u>ii</u>	scald			

023 Frequency = 26

<u>li</u>	boll	poll	roll	toll
<u>ii</u>	troll			
<u>iii</u>	roller	tollgate		
<u>2i</u>	bold	cold	fold	gold
	hold	mold	old	sold
	told			
<u>ii</u>	scold			
<u>iii</u>	folder	golden	goldfish	holder
	molding	olden		
<u>3i</u>	bolt	colt	jolt	

13,3 Frequency = 72

122 Frequency = 21

<u>li</u>	bind	find	hind	kind
	mind	rind	wind(Vb)	
<u>ii</u>	blind	grind		
<u>iii</u>	binder	blindfold	kindly	kindness
	winding	windup		
<u>2i</u>	child	mild	wild	
<u>iii</u>	grandchild	wildcat	wildly	

024 Frequency = 51

<u>lai</u>	dong	gong	long	song
	tong			
<u>ii</u>	strong			
<u>iii</u>	dingdong			
<u>iv</u>	along	oblong		
<u>lbi</u>	bog	dog	fog	hog
	log	tog		
<u>ii</u>	clog	frog		
<u>iii</u>	bulldog	doggy	dogwood	foggy
	hotdog	leapfrog		
<u>lci</u>	off			
<u>iii</u>	blast-off	kickoff	take-off	
<u>iv</u>	coffee	coffin	office	
<u>ldi</u>	loft	soft		
<u>iii</u>	hayloft	softly		

13,3 (con't) lei honk

3ai boss loss moss loss

ii cross

iii crossing glossy

iv across

3bi cost lost

ii frost

iii frosting frosty

iv ostrich

3ci moth

ii cloth

Block 14 Frequency = 80

14,1 Frequency = 35

Stressed VCe# Frequency = 35

<u>1a</u>	badge	bridge	dodge	edge
	fudge	hedge	judge	lodge
	pledge			
<u>1b</u>	hedgehog			
<u>1c</u>	badger	midget		
<u>2a</u>	chance	dance	dunce	fence
	glance	lance	mince	prance
	prince	since		
<u>2ci</u>	dense	rinse	sense	
<u>2cii</u>	immense	nonsense		
<u>3</u>	bulge	else	shelve	twelve
<u>4a</u>	bronze	grippe		
<u>4b</u>	barrette	giraffe		

14,2 Frequency = 18

Stressed VrCe# Frequency = 18

<u>1a</u>	curse	horse	nurse	purse
	verse	worse		
<u>1b</u>	horseback	converse	immerse	
<u>2</u>	carve	curve	nerve	serve
	starve			
<u>3</u>	charge	gorge	large	urge

14,3 Frequency = 27

Unstressed VCe# and VCe Frequency = 27

<u>1</u>	absence	distance	entrance	sentence
	substance			
<u>2</u>	bandage	cabbage	college	cottage
	garbage	message	package	passage
	village			
<u>3</u>	furnace	justice	lettuce	necklace
	practice	service	surface	
<u>4</u>	capsule(P)	engine	fertile	injure
<u>5</u>	orange	porridge		

Third-Year Word List

Frequency = 3213

B k 15 Frequency = 904

15,1 Frequency = 84

8-9 one-syllable words with first-year rules, Frequency = 84

Alps	bluff	brag	breed
brim	brisk	bunt	clank
clash	crier	clomp	cog
crock	deem	disc	dwelt
flank	flask	flunk	flush
fund	gland	gosh	grasp
gull	gust	gut	helm
hiss	jazz	lab	leer
lest	loll	lull	mesh
mid	mint	mock	mull
musk	nun	puck	pulp
pus	plush	rash	scum
sect	seer	sex	sheen
sheer	shod	skeet	slash
sleek	smith	snack	sneer
snub	snug	splint	sprint
spud	steed	stilt	Swiss
tempt	text	theft	throb
vamp	vast	vat	vent
vex	vim	weld	wend
width	-yam	yank	yelp

15,2 Frequency = 820

8-9 words with second-year rules, Frequency = 820

Block 5 Frequency = 31

5,1 Compounds

blackjack	bobcat	buckshot	buckskin
cobweb	codfish	dishpan	dishrag
flagstaff	grandad	grassland	handbag
handcuff	hemlock	humbug	jackass
junkman	pigskin	ramjet	ramrod
redskin	sheepskin	snapshot	standstill
sunbath	sunfish	sunstruck	upkeep
upland			

5,5 NG10 clung ping

Block 6 Frequency = 41

6,1 All	bate	blare	crape	gape
	gaze	glaze	hale	maze
	rape	shale	vale	
III	bile	file	pike	prime
	sire	spire	strife	swine
	thine	wile		
6,2 011	bole	cope	cove	doze
	drone	grone	pore	Rome
	rote	shone	stoke	strode
	yore			
III	brute	lute	mute	yule

E11 mere mete

EE10 + E18 peeve

Block 7 Frequency = 4

7,1 C11 mace scent vice
 G11 wage

Block 8 Frequency = 47

8,1 Compounds

 backbone bedside brimstone firebug
 glassware hereby hotline lampshade
 lifetime red-wing sandstone shipmate
 spruce-up

8,2 A16 abstract ally alpine athlete
 baptize bankrupt capsize cashmere
 mascot / pastime shamrock
 I16 dictate incline(N) impact insult(N)
 kidnap linseed mishap
 U16 nutmeg suffix
 E16 empire extract(N) textile
 O16 bonbon combat(N) combine(N) complex
 compress(N) conflict(N) construct(N) contact
 contrast(N) convict(N) prospect

Block 9 Frequency = 35

9,1 A21 harsh

021	scorn	shorts	snort	
U21	blur	blurt	burr	cur
	surf	turf		
121	firm			
E21	serf			
9,2 E21	blunder	butler	cancer	canker
	capper	clatter	cobbler	convert (N)
	creeper	cruller	culvert	differ
	duster	elder	feeler	finder
	gender	glimmer	glitter	hamper
	insert (N)	jester	jobber	killer
	lifter	mid-term	permit (N)	plotter
	popper	prosper	putter	rafter
	render	rocker	scrapper	seeker
	sherbert	shudder	slacker	slicker
	smelter	snicker	splatter	stepper
	sticker	suffer	tamper	tanner
	tester	thriller	tinder	totter
	usher	wicker		
U21	burlap	surplus	surname	turnpike
121	birthplace			
A21	boxcar	firearm	hardship	marker
	parsnip	rampart	shipyard	
U21	borax	border	concord	corncob
	cornstarch	export	import	leghorn
	porthole			

9,3	A25	lukewarm	warbler	warden	warlike
		warp	warpath	warship	
	022	byword			
Block 10 Frequency = 321					
10,1	117	antic	arctic	bobbin	classic
		fossil	frantic	garlic	gossip
		mannish	muffin	nostril	peevish
		transit	trellis	virgin	weevil
	U17	census	citrus		
	E17	anthem	bracket	congress	corset
		crescent	dampen	dampness	darken
		emblem	empress	ferret	fireless
		flannel	fortress	hamlet	haruress
		harmless	helmet	helpless	hornet
		hundredth	inlet	kindred	likeness
		madness	marvel	minstrel	morsel
		picket	priceless	restless	rickets
		rocket	sadden	segment	shipment
		shorten	sleepless	sleeveless	socket
		stillness	stricken	sullen	sweetness
		tempest	thicken	tireless	torrent
		trinket	wireless	witness	worthless
	A17	ballad	baseman	canvass	constant
		coral	craftsman	currant	delta
		distant	drunkard	garland	gizzard

	herdsman	Holland	instant	Ireland
	jackal	larval	mammal	marshal
	mental	mortal	northward	onward
	pillar	portal	scandal	sportsman
	stanza	sultan	trespass	tundra
	vassal	villa	warrant	westward
017	ballot	beckon	bishop	captor
	castor	custom	error	factor
	falcon	horror	parson	pastor
	ransom	reckon	rector	sexton
	splendor	sponsor	summon	terror
	victor			
10,2 Y17	belfry	burly	caddy	clergy
	crabby	curry	deeply	dimly
	dingy	dory	entry	envy
	filthy	finely	firmly	fleshy
	folly	freely	gentry	glassy
	grassy	gritty	hanky	hardy
	madly	marshy	merely	misty
	mummy	musty	petty	pigmy
	putty	rally	rarely	rudely
	scanty	scurry	scurvy	sentry
	shanty	sickly	sissy	slushy
	speedy	starry	stately	stuffy
	sultry	thickly	trusty	widely
	wintry			

LE22	ample	babble	brittle	crumple
	curdle	dazzle	drizzle	gamble
	griddle	humble	hurdle	jumble
	meddle	mingle	mumble	nettle
	nozzle	scuffle	shuttle	sickle
	spangle	spindle	startle	strangle
	throttle	tingle	topple	tremble
	trickle			
10,4 116	disarm	discuss	disgust	dislike
	dispute	distinct	distract	impress
	infect	infest	inflame	inhale
	insert (Vb)	insist	instruct	invade
	invest	misled	misspell	sincere
UI6	sub	subsist	unfit	unfurl
	unhand	unnurt	unkept	unpack
016	blockade			
A16	abduct(P)	adhere(P)	cascade	stampede
	transmit			
E21	permit (Vb)	perspire		
021	ornate			
EE10	canteen	exceed	foresee	misdeed
	unseen			
10,5 A17	abide	absurd	adapt	adore
	adorn	advise	affect	afloat
	ally (Vb)	amend	ascend	assess
	assist	attempt	award	aware
	career	galore	Japan	

E17	descend	descent	derive	devote
	effect	embrace	emerge	encamp
	endure	enforce	enlist	estate
	exhale	expand	expel	expend
	extract	extreme	extinct	neglect
	secede	seclude	secure	severe
017	combat (Vb)	combine (Vb)	commit	compare
	compress (Vb)	concern	confess	confine
	confirm	conflict (Vb)	consent	consist
	construct (Vb)	consult	contrast (Vb)	convert (Vb)
	convict (Vb)	forbid	forgave	forsake
	oblige	obscene	offend	oppress
U17	suppress	supreme		
117	brigade			

Block 11 Frequency = 61

11,1 NG10	bedding	dwelling	gangster	inning
	matting	netting	shilling	wording
11,2 CH10	arch	archer	bechnut	chant
	char	charter	cheep	chuckle
	cinch	drench	duchess	enchant
	gulch	hunchback	leech	parch
	parchment	scorch	starchy	
TCH10	clutch	crotch	etch	hemstitch
	pitchfork	snatch	twitch	witchcraft
11,3 WH10	cartwheel	whit	whittle	

11,4 QU10

acquire	conquest	jonquil	quench
quest	quill	quitter	quorum
squid	squint	squire	tranquil

11,5 GG10

druggist	luggage	smuggle	snuggle
struggle	trigger		

CC12

accord	occur	yucca
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11,6 G31

gilt	hunger
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Block 12 Frequency = 107

12,1 AY10

array	betray	dismay	essay
fray	gateway	maypole	midday
portray	rayon	wayside	

12,2 EA11

beading	bleach	bleary	buckwheat
clearly	cleave	conceal	creaky
creamy	dean	dreamland	dreamy
eastern	eastward	eater	fearless
freak	gleam	glean	meanness
meantime	meatless	mislead	plead
reader	seaplane	seaport	seashell
sneaker	speaker	teat	treatment
treaty	unclean	veal	weakly
weakness	zeal		

EA31

bearer	bearing	bedspread	blockhead
breastpin	breathless	deadly	dealt
forbear	spreader	threat	threaten

12,3 0011

bassoon	booh	bridegroom	croon
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	doom	foodstuff	gloom	groove
	maroon	monsoon	noodle	ooze
	poorly	roofing	roomer	scoot
	snoop	snooze	spook	woo
0012	bankbook	brooklet	foothill	footprint
	footstool	forefoot	goodly	goodness
	woodman			
12,4 0W11	billow	blowtorch	blower	burrow
	growth	lowland	mower	mown
0W12	downstream	Moscow	prowl	rowdy
	scowl	sundown	tower	township
	vow			

Block 13 Frequency = 57

13,1 031	comfort	fearsome	hovel	hover
	London	monk	monthly	someplace
031	bullhead	fearful	fully	glassful
	hopeful	pushcart	shameful	shot-put
	sinful			
13,2 A43	handball	install	squall	
023	ahold	enroll	goldfinch	goldsmith
	molder	stroil	unfold	uphold
	volt			
13,3 122	binder	blinding	childhood	childish
	grinder	grindstone	markind	unkind
024	bong	bossy	Boston	broth

bullfrog	costly	crossbar	crossbow
crossword	flog	floss	froth
gloss	Hong Kong	lofty	logger
offer	ping-pong	show-off	softwood

Block 14 * Frequency = 56

14,1	advance	avenge	budge	collapse
	convince	corpse	densely	dredge
	expense	France	glimpse	hence
	henceforth	incense	intense	involve
	ledge	misjudge	offense	partridge
	pence	pulse	response	ridge
	sixpence	sledge	solve	trudge
	valve	wedge	whence	
14,2	barge	commerce	discharge	disperse
	divorce	enlarge	force	forge
	horsefly	horseless	horseman	largely
	serge	surge		
14,3	active	bondage	captive	challenge
	doctrine	ermine	hostile	instance
	mileage	terrace	tonnage	

Block 16 Frequency = 488

16,1 Frequency = 135

· A110 Frequency = 135

<u>1bi</u>	aid	ail	aim	
<u>ii</u>	air			
<u>2bi</u>	bail	bait	chain	fail
	faith	gain	gait	hail
	jail	laid	lain	maid
	mail	maim	main	nail
	paid	pail	pain	raid
	rail	rain	sail	tail
	vain	wail	wait	
<u>ii</u>	chair	fair	hair	lair
	pair			
<u>4ai</u>	faint	maize	paint	saint
	waist			
<u>4bi</u>	braid	brain	claim	drain
	flail	frail	grain	plain
	quail	slain	snail	staid
	stain	trail	train	trait
<u>ii</u>	stair			
<u>5ai</u>	quaint			
<u>5bi</u>	sprain	strain	strait	

to, t (cont)	<u>6ai</u>	bandage	bobtail	cattail	cocktail
		hangnail	horsetail	mailbag	mailbox
		mailman	mainland	nailfile	railway
		raindrop	rainfall	shirtwaist	
	<u>ii</u>	airedale	airline	airplane	airport
		airshaft	airship	airway	armchair
		chairman	haircut	hairnet	hairpin
		stairway			
	<u>6bi</u>	faithful	jailer	maiden	mainly
		painter	painting	plainly	railing
		rainy	strainer	trainer	waiter
		unpaid			
	<u>ii</u>	airy	fairly	hairy	unfair
	<u>7ci</u>	acquaint	afraid	attain	await
		complain	complaint	contain	daily
		dainty	drainage	exclaim	explain
		failure	gaily	maintain	mermaid
		obtain	portrait (P)	restrain	sailor
		sustain	tailor	traitor	waitress
	<u>ii</u>	affair	dairy	despair	fairy

16,2 Frequency = 98

-95-

0010 Frequency = 98

<u>1b</u>	couch	out		
<u>1i</u>	out			
<u>2a</u>	thou			
<u>2b</u>	teat	couch	foul	loud
	mouth	noun	pouch	pout
	shout	south		
<u>3i</u>	sour			
<u>4a</u>	bound	count	found	gouge
	nound	mound	nount	pound
	round	sound	round (1/18	past tense of <u>wind</u>)
<u>4b</u>	cloud	crouch	proud	scout
	slouch	snout	spout	stout
	trout			
<u>5i</u>	flour	scour		
<u>5a</u>	ground			
<u>5b</u>	ounce	lounge	ounce	pounce
	apron			
<u>6a</u>	background	blowout	count down	cutout
	dugout	fairground	foreground	hideout
	lookout	outfit	outline	outplay
	output	outrage	outside	outskirts
	playground	roundup	snowbound	southeast
	southwest	without		
<u>9b</u>	counter	countless	cloudy	founder
	loudly	mouthful	outer	outing
	prouter	proudly	roundish	touchy
	soundly			

16,2 (con't)

7a

outlet

7c

about

account

aloud

amount

announce

around

compound

council

counsel

countess

county

discount

flounder

foundry

grouchy

pronounce

southward

surround

11

devour

16,3

Frequency = 89

0E10

Frequency = 7

1

doe

foe

hoe

toe

woe

2

tiptoe

toenail

16,3 (con't) 0A10 Frequency = 82

<u>1bi</u>	oak	oat	oath	
<u>ii</u>	oar			
<u>2ai</u>	whoa			
<u>2bi</u>	boat	coach	coal	coax
	foam	goal	goat	load
	loaf	loam	loan	moan
	moat	poach	roach	road
	room	roan	shoal	soak
	soap	toad		
<u>ii</u>	boar	roar	soar	
<u>4ai</u>	boast	coast	roast	toast
<u>ii</u>	board	hoard		
<u>4bi</u>	bloat	cloak	croak	float
	groan	throat		
<u>5bii</u>	coarse	hoarse		
<u>6ai</u>	carload	charcoal	cloakroom	crossroad
	flatboat	lifeboat	oatmeal	railroad
	raincoat	roadside	rowboat	sailboat
	seacoast	stagecoach	steamboat	tugboat
	waistcoat (P)			
<u>ii</u>	billboard	blackboard	cardboard	seaboard
	sideboard	surfboard	uproar	
<u>6bi</u>	floating	coastal	coaster	loafer
	oaken	soapy	toaster	unload
<u>ii</u>	boarder	roaring		
<u>7ci</u>	afloat	approach	roadster	
<u>ii</u>	aboard			

16,4 Frequency = 61

AW10 Frequency = 44

<u>1b</u>	ave	awl		
<u>2a</u>	caw	jaw	law	paw
	raw	saw	thaw	
<u>2b</u>	bawl	dawn	fawn	hawk
	lawn	shawl	yawn	
<u>3b</u>	claw	craw	draw	
<u>4b</u>	crawl	drawn	spawn	
<u>5b</u>	sprawl	squaw	squawk	straw
<u>6a</u>	crawfish	drawbridge	jigsaw	lockjaw
	outlaw	rawhide	rickshaw	sawdust
	sawmill	seesaw	withdraw	
<u>6b</u>	drawing	lawful		
<u>7a</u>	awful	awkward	awning	
<u>7c</u>	gawky	lawyer		

AW10 Frequency = 17

<u>2b</u>	haul	maul		
<u>4a</u>	fault	gauze	haunt	launch
	sauce	vault		
<u>6a</u>	saucepan			
<u>7a</u>	auburn	August	author	
<u>7c</u>	applaud	faucet	laundry	saucer
	valet			

16,5 Frequency = 48

0110 Frequency = 26

1b oil

2b boil coil coin foil

 join loin soil toil

4a choice joint moist point

 voice

4b broil spoil

5a spoilt

6a oilcloth

6b pointer oily

7a ointment

7c appoint avoid coinage doily

 toilet

0Y10 Frequency = 22

2a boy coy joy toy

6a bellboy boyhood cowboy soybean

 tomboy toyland toyshop

6b boyish joyful

7a oyster

7b ahoy annoy destroy employ

 enjoy

7c loyal royal voyage

16,6 Frequency = 57

UE10 Frequency = 20

<u>2a</u>	due	hue	sue
<u>2b</u>	duel	fuel	
<u>3b</u>	blue	clue	flue glue
	true		
<u>4b</u>	cruel		
<u>6a</u>	bluebell	bluebird	bluejay blueprint
	skyblue		
<u>6b</u>	cruelly	untrue	
<u>7b</u>	arque	rescue	

UI10 Frequency = 7

<u>1</u>	fruit	juice	suit
<u>2</u>	fruitcake	grapefruit	lawsuit
<u>3</u>	pursuit		

EW10 Frequency = 30

<u>2a</u>	chew	dew	few	meow
	new	pew	whew	
<u>3!</u>	blew	brew	crew	drew
	flew	grew	stew	threw
<u>5b</u>	screw	strew	strewn	
<u>6a</u>	brandnew	dewdrop	newborn	New York
<u>6b</u>	newly	unscrew		
<u>7b</u>	new			
<u>7c</u>	jew	pewter	sewage	sewer
	steward			

= always pronounced [ju:]

= always pronounced [ju:]

unasterisked words may be pronounced either [ju:] or [ju:], but [ju:] predominates.

block 17 Frequency = 402

17,1 Frequency = 123

three-syllable compounds Frequency = 123

afternoon	alderman	alongside	angleworm
applesauce	archbishop	backwoodsman	baggage
barbershop	basketball	battleship	blackberry
blueberry	bluebonnet	bric-a-brac	bumblebee
buttercup	butterfly	buttermilk	butternut
butterscotch	buttonhole	candlestick	cannonball
checkerboard	coffeepot	commonwealth	cottonseed
cottontail	cottonwood	crackerjack	cubbyhole
dairyman	fairyland	fellowman	ferryman
ferryboat	finger nail	fingerprint	firecracker
fisherman	flowerpot	flyaway	forefinger
gentleman	gingerale	gingerbread	goldenrod
Grand Canyon	grandchildren	granddaddy	grasshopper
gunpowder	headquarters	hereafter	hobbyhorse
Hollywood	horsepower	hummingbird	jellybean
jellyfish	leadership	lollypop	lumberjack
lumberman	lumberyard	membership	midsummer
mockingbird	motorboat	needlework	New Orleans
northeastern	northwestern	orangeade	outerspace
partnership	peppermint	pineapple	pocketbook
pumpkinseed (p)	pussycat	quarterback	quicksilver

man [mæn]

man [mæn]

5 - [z]

17,1 (con't)

rattlesnake	runaway	salesmanship#	silverware
skyrocket	southeastern	southwestern	sportsmanship
strawberry	storybook	summertime	sunbonnet
sunflower	tattletale	teakettle	tenderfoot
three-cornered		thunderstorm	tinderbox
ting-a-ling	trustworthy	underbrush	underground
underline	underneath	underpass	undershirt
underskirt	understand	understood	undertake
undertook	underwear	uppercut	wildflower
windowpane	wintergreen	wintertime	wonderland

17,2 Frequency = 162

-er Frequency = 45

<u>1</u>	baker	blazer	choker	diner
	diver	driver	glider	grader
	hater	liner	maker	miner
	pi-per	poker	Quaker	racer
	rider	rover	ruler	saver
	scraper	shaker	shiner	skater
	tamer	trader	tuner	voter
<u>2</u>	carver	dancer	freezer	ledger
	lover	weaver		
<u>3</u>	fiddler	gobbler	muffler	peddler
	rattler	sampler	settler	sparkler
	tumbler			
<u>4</u>	drier	flier		

-en Frequency = 9

<u>1</u>	broken	frozen	ripen	shaken
	spoken	stolen	taken	waken
	woven			

-ing Frequency = 16

<u>1</u>	aging	biting	boring	daring
	dining	icing	lining	making
	piling	saving	shaving	siding
	striking	tubing		
<u>2</u>	bluing	carving		

-y Frequency = 14

<u>1</u>	bony	grimy	icy	scaly
	scary	shady	shaky	shiny
	smoky	stony	wavy	
<u>2</u>	fleecy	horsy	juicy	

17,2 (con't) -s Frequency = 49

<u>1a</u>	arms	arms	blinds	blues
	dues	eaves	goods	greens
	guns	hers	lens	means
	news	ours	shears	suds
<u>1b</u>	backwoods	beeswax	downstairs	insides
	newsboy	newsman	newsmen	salesman
	sideways	statesman	sweepstakes	tenpins
	upstairs	upwards		
<u>1c</u>	gallows	goggles	manners	oodles
	pliers	rompers	rubbers	tidings
	tweezers			
<u>1d</u>	ourselves	selves	sheaves	themselves
	wives			
<u>2a</u>	blazes	glasses	riches	
<u>2b</u>	funnies	studies		

-ed Frequency = 29

<u>1ai</u>	armed	bagged	barbed	bobbed
	chapped	charred	heeled	mashed
	skilled	tanned	webbed	winged (P)
<u>1aii</u>	checkered	concerned	hardboiled	tattered
<u>1b</u>	blessed (P)	peaked (P)		
<u>2ai</u>	bored	tired	famed	striped
<u>2aii</u>	ashamed	freckled	refined	unruled
<u>2b</u>	dated	faded		
<u>3</u>	candied			

17,3 Frequency = 117

-er Frequency = 48

<u>1a</u>	commander	container	customer	destroyer
	employer	follower	forester	gardener
	kidnapper	propeller	retainer	sharpener
	sufferer	trumpeter	transformer	
<u>1b</u>	announcer	condenser	divider	explorer
	producer	subscriber	villager	voyager
<u>2a</u>	anteater	bookkeeper	bootlegger	cowcatcher (P)
	dogcatcher (P)	frankfurter	hairstresser	hamburger
	innkeeper	kingfisher	nutcracker	penholder
	roadrunner	sheepherder	stonecutter	storekeeper
	woodcutter	woodpecker		
<u>2b</u>	caretaker	dressmaker	lifesaver	outsider
	sandpiper	sky-scaper	teenager	

-en Frequency = 3

awaken forgotten forsaken

-ing Frequency = 12

bookkeeping bottling (P) concerning fairyling
furnishings happening oncoming outstanding
pertaining seafaring surroundings Thanksgiving

-ed Frequency = 6

assorted back-handed excited forested
left-handed redheaded

17,3 (con't) -ly Frequency = 48

<u>1</u>	amlessly	bitterly	breathlessly	carelessly
	commonly	constantly	correctly	cowardly
	directly	eagerly	entirely	evenly
	extremely	foolishly	formerly	heavenly
	helplessly	immensely	instantly	intensely
	lovingly	normally	orderly	perfectly
	politely	quarterly	securely	severely
	sincerely	suddenly	westerly	willingly
<u>2</u>	angrily	cheerily	happily	heavily
	luckily	merrily	readily	steadily
<u>3</u>	awfully	carefully	cheerfully	faithfully
	gracefully	joyfully	peacefully	thankfully

Block 18 Frequency = 112

18,1 Frequency = 304

E13 Frequency = 121

<u>1</u>	rebel (Vb)	recall	recede	recent
	recess	recite	record (Vb)	redress
	reduce	refer	refine	reform
	refuel	regard	rejoice	relate
	relay	relent	rely	remain
	remains	remark	remind	rent
	rename	repaid	repair	repay
	repeal	repeat	report	request
	require	retail	retire	return
	reveal	revenge	reverse	revive
	revolve	reward		
<u>2</u>	became	become	befall	before
	began	begin	begun	behave
	beheld	behind	behold	belong
	below	beneath	berate	beside
	beware	bewitch	beyond	
<u>3</u>	debate	decay	decent	decide
	decoy	deduct	defeat	defect
	defend	defense	define	delay
	demand	deny	depart	depend
	deport	detail	detect	device
<u>4</u>	elapse	elect	elope	equal
	era (P)	erect	even	event
	evil			

18,1 (con't)

<u>5</u>	precede	predict	prefer	prefix
	prepaid	prepare	pretend	prevail
	prevent			
<u>6</u>	cedar	female	fever	frequent
	legal	meter	pecan (P)	scenic
	serum	tepee		
<u>7</u>	beginner	belonging	beloved (P)	ally
	frequently	recently	reducer	laced
	reminder	reporter	revolver	revolving

18.1 (con't) 013 Frequency = 72

<u>1</u>	oboe	odor	omit	opal
	open	oval	over	
<u>2</u>	proceed	prolong	protest	
	opus	colon	cozy	focus
	holy	hotel	kodak	local
	locate	locust	mobile (P)	Mohawk
	molar	moment	motel	motor
	nomad	notice	polar	Polish
	pony	robot	Roman	romance
	rotate	sober	soda	sofa
	solar	thorax	token	topaz
	total	totem	vocal	
<u>4</u>	clover	crocus	grocer	pronoun
	slogan	storage		
<u>5</u>	moreover	motorcar	motorman	opener
	opening	orally	overalls	overboard
	overcast	overcoat	overcome	overflow
	overhaul	overhead	overhear	overjoyed
	overland	overlook	oversleep	overtake
	overturn			

18,1 (con't) A13 Frequency = 43

<u>1</u>	acorn	agent	baby	bacon
	caper	crater	crazy	fatal
	favor	flavor	gravy	haven
	hazel	label	labor	laden
	lady	lazy	major	naked
	native	naval	navy	pagan
	paper	radar	raven	razor
	saber	taper	vacant	vapor
	wafer			
<u>2</u>	babytalk	flavoring	laborer	ladybug
	landlady	lazily	newspaper	sabertooth
	sandpaper	wallpaper		

113 Frequency = 39

<u>1</u>	ideal	iris	Irish	item
	ivy			
<u>2</u>	china (China)	cider	digest	direct (P)
	divan (P)	fiber	final	finance
	license	lilac	minor	minus
	minute (Aj)	pilot	pirate	rival
	silence	silent	siren	tidy
	tiger	tiny	viking	vizor
	viry			
<u>3</u>	bridal	climate	Friday	private
	spider	spiral		
<u>4</u>	chinaware	finally	silently	

18,1 (con't) U13 Frequency = 29

<u>1i</u>	Cuba	cubic *	duty	hula *
	human (P)	humane ** (P)	humor ** (P)	July
	puny *	pupil *	ruby *	rumor *
	tulip	tunic	tutor	unit *
	unite *			
<u>ii</u>	during	jury	mural *	rural *
<u>2i</u>	brunette *	brutal *	plumage *	student
	stupid	truly *		
<u>ii</u>	plural			
<u>3</u>	superman			

* = always pronounced [u]

** = always pronounced [yu]

Unasterised words may be pronounced either [u] or [yu], but [u] predominates.

18,2 Frequency = 151

S20 Frequency = 94

2a use (Vb)

2b cause cheese chose close (Vb)

fuse hose noise nose

pause pose raise rise

rose these those wise

3b bruise cruise praise prose

clause

6a crosswise likewise primrose rosebud

rosewood sunrise

6b chosen easy noisy noiseless

rosy unused unwise wisely

7b abuse (Vb) accuse advise amuse

applause arise arose because (P)

Chinese (P) compose comprise confuse

despise excuse expose oppose

refuse repose suppose surprise (P)

7c daisy desert (Vb) deserve desire

drowsy laser miser music

peasant poison pleasant present (Vb)

preserve preside presume raisin

reason resent reserve resist

resolve resort result rosette

season thousand thousandth treason

trousers weasel

18,2 (con't)

8a cheeseburger cheesecloth

8b amusing composer easily pleasantly
seasoning noiselessly

S21 Frequency = 56

1a blouse grouse house (N) louse
mouse

1b bathhouse birdhouse boathouse clubhouse
farmhouse greenhouse henhouse hothouse
houseboat household housekeeper housemaid
housetop housewife housework meetinghouse
mousetrap pesthouse playhouse powerhouse
roundhouse smokehouse storehouse warehouse

2a base case chase vase

2b basement bookcase erase eraser
pillowcase purchase showcase staircase
suitcase

3 cease crease decrease grease
greasy (P) increase lease release

4 caboose goose gooseberry loose
loosely moose noose

18,3 Frequency = 29

A22 Frequency = 29

<u>1</u>	Arab	baron	caret	carol
	caroler	grandparent	parent	Paris
	tariff	vary		
<u>2</u>	arrow	arrowhead	barrel	barren
	carrier	carrot	carry	carryall
	garret	harrow	marrow	marry
	narrow	parrot	sparrow	tarry
	wheelbarrow			
<u>3</u>	scarce	scarcely		

18,4 Frequency = 28

025 Frequency = 28

<u>1</u>	fro	go	ho	lo
	no	so		
<u>2</u>	hero	hobo	polo	silo
	solo	yoyo	zero	
<u>3</u>	alto	auto	banjo	bingo
	bronto	cargo	fatso	grotto
	jello	lasso	lotto	motto
	stucco			
<u>4</u>	aqo	hello		

Block 19 Frequency = 287

19,1 Frequency = 81

-ment Frequency = 23

<u>1</u>	advancement	agreement	amendment	amusement
	announcement	appointment	attainment	contentment
	employment	enjoyment	engagement	enrollment
	equipment	excitement	government	investment
	settlement			
<u>2</u>	apartment	assortment	compartment	department
	deportment	embankment		

-or Frequency = 14

<u>1</u>	conductor	contractor	director	erector
	governor	inspector	instructor	inventor
	professor	projector		
<u>2</u>	advisor	dictator	equator	survivor

-ive Frequency = 14

<u>1</u>	attractive	detective	digestive	effective
	excessive	inventive	oppressive	possessive
	progressive			
<u>2</u>	destructive	exclusive	expensive	explosive
	extensive			

-ness Frequency = 12

<u>1</u>	carelessness	eagerness	foolishness	gentleness
	politeness	selfishness		
<u>2</u>	business	cleanliness	happiness	laziness
	loveliness	readiness		

19,1 (con't) -ance/-ant Frequency = 18

<u>1</u>	acceptance	admittance	allowance	appearance
	assistance	assistant	attendance	attendant
	performance			
<u>2</u>	alliance	endurance	ignorance	ignorant
<u>3</u>	abundance	abundant	accordance	importance
	important			

19,2 Frequency = 88

1E11 Frequency = 8

<u>1</u>	die	fie	lie	pie
	tie			
<u>2</u>	magpie	necktie	untie	

124 + GH10 Frequency = 60

<u>2a</u>	high	sigh	thigh	
<u>2b</u>	fight	light	might	night
	right	sight	tight	
<u>4a</u>	tights			
<u>4b</u>	blight	bright	flight	fright
	plight	slight		
<u>6a</u>	airtight	daylight	flashlight	foresight
	headlight	highchair	highjump	highland
	highway	lighthouse	midnight	moonlight
	nightgown	nighttime	right-hand	skylight
	streetlight	sunlight	upright	
<u>6b</u>	brighten	brightly	brightness	fighter
	frighten	frightful	highly	lighter
	lightly	mighty	relight	rightly
	slightly	tighten	tightly	
<u>7c</u>	delight	lightning	tonight	twilight
<u>8a</u>	overnight			
<u>8b</u>	delighted	highlander	right-handed	sight-seeing

19,2 (con't) GH10 Frequency = 13

<u>1</u>	bough	plough		
<u>2</u>	caught	naught	straight	taught
<u>3</u>	daughter	granddaughter	naughty	naughty
	slaughter	slaughterhouse	straighten	

H20 Frequency = 7

<u>1</u>	herb	hour		
<u>2</u>	huh	pooh	ugh	
<u>3</u>	graham	shepherd		

19,3 Frequency = 59

K20 Frequency = 26

<u>1a</u>	knee	knew	know	
<u>1b</u>	knack	knead	kneel	knell
	knit	knob	knock	knoll
	knot			
<u>3a</u>	knave	knelt	knife	knight
<u>6a</u>	jackknife	knapsack	knighthood	knothole
<u>6b</u>	pocketknife	topknot		
<u>6b</u>	knotty	unknown		
<u>7a</u>	knickers	knuckle		

G20 Frequency = 9

<u>1</u>	gnat	gnaw		
<u>2a</u>	assign	assignment	design	resign
	sign	signboard		
<u>2b</u>	campaign			

19,3 (cont.) W20 Frequency = 24

<u>1b</u>	wrap	wrath	wreath	wreck
	wren	wretch	wring	wrong
<u>3a</u>	wrench	wrist	write	wrote
<u>6a</u>	shipwreck			
<u>6b</u>	rewrite	unwrap	wrapper	wrecker
	wringer	writer		
<u>7a</u>	wiggly	wrinkle	wristlet	written
<u>8a</u>	handwriting			

19,4 Frequency = 13

B20 Frequency = 13

<u>2b</u>	bomb	dumb	lamb	limb
	numb	thumb		
<u>3b</u>	crumb	plumb		
<u>6a</u>	dumbbell	lambskin	thumbtack	
<u>6b</u>	bomber	plumber		

19,5 Frequency = 40

L20 Frequency = 21

<u>1a</u>	balk	chalk	stalk	talk
	salv			
<u>1t</u>	to m talk	chalkboard	cornstalk	sidewalk
	taker	walker		
<u>2</u>	folk	kinsfolk	yolk	
<u>3</u>	behalt	calf	half	halfway
<u>4</u>	calves	salve		
<u>5</u>	al on			

T20 Frequency = 19

<u>1</u>	rustle	bustle	castle	aristle
	rustle	jostle	nestle	rustle
	rustle	trestle	whistle	wrestle
<u>2</u>	tasten	alisten	listen	listener (P)
	orsten			
<u>2</u>	after	soften		

13,6 Frequency = 6

020 Frequency = 6

<u>1</u>	guard	guess	quest	guide
<u>2</u>	quilt	safeguard		

Block 20 Frequency = 119

20,1 Frequency = 48

y Frequency = 12

1	arcery	armory	cannery	creamery
	Germany	pottery	unity	
2	injury	sunshiny		
3	agency	loyalty	rivalry	

-ful Frequency = 8

colorful	forgetful	plentiful (<u>y</u> [i] → <u>i</u> [i])
powerful	sorrowful	teacupful teaspoonful
wonderful		

-al Frequency = 7

1	orbital	personal	renewal	musical
2	arrival	festival	recital	

-able Frequency = 6

1	passable	peaceable	seeable	suitable
2	likable	lovable		

-eth Frequency = 5

fiftieth	fortieth	sixtieth	thirtieth
twentieth			

-less Frequency = 4

colorless	odorless	penniless (<u>y</u> [i] → <u>i</u> [i])
regardless		

-ist Frequency = 4

loyalist	motorist	organist	soloist
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-ish Frequency = 2

kittenish	yellowish
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20,2 Frequency = 39

PH10 Frequency = 19

<u>3a</u>	phase	phone		
<u>3b</u>	graph			
<u>4c</u>	phrase			
<u>5c</u>	sphere	sphinx		
<u>7a</u>	phantom	pheasant	phony	photo
<u>7c</u>	asphalt	camphor	graphic	nephew
	orphan	pamphlet	phosphate	prophet
	sulphur			

CH31 Frequency = 20

<u>3a</u>	chord			
<u>4c</u>	chrome			
<u>5a</u>	school			
<u>5c</u>	scheme			
<u>6a</u>	schoolbag	schoolbook	schoolboy	schoolhouse
	schoolmate	schoolroom	schooltime	
<u>6b</u>	schooling			
<u>7a</u>	chorus	christen		
<u>7b</u>	stomach			
<u>7c</u>	echo	orchid	schooner	
<u>8a</u>	schoolmaster	schoolteacher		

20,3 Frequency = 26

TH12 Frequency = 26

<u>1a</u>	bother	brother	farther	feather
	further	gather	leather	mother
	other	rather	smother	weather
	whether	whither	wither	
<u>1b</u>	brotherly	gatherer	godmother	grandmother
	leathery	otherwise	pinfeather	stepmother
	weatherman			
<u>2</u>	northern			
<u>3</u>	breathe			

20,4 Frequency = 6

CC11 Frequency = 6

<u>1</u>	accent	accept	succeed	success
<u>2</u>	acceptance	successful		

Block 21 Frequency = 177

21,1 Frequency = 37

un- Frequency = 19

unbroken	unbuckle	unbutton	unconcerned
uncover	uneasy	uneven	unhappy
unharness	unhealthy	uninjured	unlawful
unlucky	unpleasant	unruly	unselfish
untangled	untidy	unwelcome	

re- Frequency = 6

readmit	reconstruct	recover	re-elect
remember	reopen		

dis- Frequency = 5

disagree	disappear	disappoint	discover
disorder			

in- Frequency = 4

incorrect	informal	inhuman	injustice
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mis- Frequency = 3

misbehave	misconduct	mispronounce	
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21,2 Frequency = 81

-tion Frequency = 81

<u>1</u>	action	auction	caution	diction
	faction	fiction	fraction	friction
	mention	motion	nation	notion
	portion	potion	section	station
	traction			
<u>2a</u>	adoption	attraction	collection	connection
	construction	contraction	correction	direction
	distinction	election	eruption	exception
	extraction	infection	inspection	instruction
	invention	objection	prevention	protection
	selection	subtraction		
<u>2b</u>	affection	carnation	commotion	confection
	proportion	salvation	solution	
<u>3</u>	devotion	dictation	donation	location
	oration	promotion	relation	rotation
	translation	vacation		
<u>4a</u>	formation	foundation	plantation	taxation
	temptation			
<u>4b</u>	quotation	starvation		
<u>5</u>	attention	conjunction	convention	description
	destruction	detention	inscription	intention
	junction	production	reception	reduction
	subscription			
<u>6</u>	fractional	sectional		
<u>7</u>	question	digestion	suggestion	

21,3 Frequency = 32

-sion → [ʃən] Frequency = 20

<u>1a</u>	mission	session		
<u>1bi</u>	confession	discussion	expression	impression
	possession	profession		
<u>1bii</u>	admission	commission	permission	
<u>1biii</u>	percussion	procession	succession	
<u>2a</u>	mansion	pension	tension	
<u>2b</u>	convulsion	dimension	expansion	

-sion → [ʒən] Frequency = 12

<u>1</u>	abrasion	occasion		
<u>2</u>	diversion	excursion		
<u>3a</u>	conclusion	erosion	explosion	seclusion
<u>3b</u>	collision	decision	division	provision

21,4 Frequency = 27

-ture Frequency = 27

<u>1</u>	capture	creature	culture	feature
	fixture	fracture	future	lecture
	mixture	moisture	nature	pasture
	picture	posture	puncture	rapture
	rupture	sculpture	structure	torture
	venture	vulture		
<u>2</u>	adventure	furniture	overture	seacreature
	signature			

Block 22 Frequency = 324

22,1 Frequency = 92

Stress pattern 3B Frequency = 92

<u>1a</u>	absolute	advertise	aggravate	altitude
	antelope	antiquate	appetite	atmosphere
	attitude	calculate	candidate	centipede
	concentrate	cultivate	envelope (N)	estimate (Vb)
	fascinate	illustrate	indicate	institute
	irrigate	multitude	sensitize	substitute
	vaccinate	ventilate	vestibule	
<u>1b</u>	alternate (Vb)	artichoke	circulate	fertilize
	fumigate	harmonize	hibernate	hurricane
	longitude	marmalade	merchandise (P)	organize
	persecute	porcupine	turpepine	vaporize
<u>2</u>	certify	crucify	dignified	fortify
	justify	lullaby	magnify	multiply
	mummify	notify	occupy	purify
	terrify	testify		
<u>3</u>	alphabet	architect	autograph	Bethlehem
	caravan	consequence	daffodil	difficult
	frankinsense	paragraph	parallel	penmanship
	photograph	subtrahend	thermostat	
<u>4</u>	anteroom	astronaut	barbecue	buffalo
	bungalow	celluloid	chickadee	corduroy
	dinosaur	indigo	marigold	mistletoe
	nowadays	parakeet	peekaboo	piccolo
	somersault	uniform	universe	yesterday

22,2 Frequency = 124

Stress pattern 3A Frequency = 124

<u>1</u>	alley	ancestry	artery	battery
	balcony	century	charity	company
	contrary	cranberry	currency	dignity
	gallery	industry	mercury	mulberry
	pharmacy	primary	prophecy	possibly
	purity	rickety	rotary	summary
	tendency	terribly		
<u>2</u>	article	barnacle	capable	constable
	follicle	horrible	icicle	multiple
	notable	particle	pinnacle	possible
	rectangle	sensible	spectacle	terrible
	vehicle			
<u>3</u>	admiral	cannibal	carnival	funeral
	hospital	interval	numeral	principal
	sentinel	terminal	vertical	
<u>4</u>	ancestor	carpenter	character	circular
	corridor	cucumber	emperor	juniper
	harrier	messenger	milliner	officer
	passenger	singular		
<u>5</u>	algebra	Florida	formula	gondola
	orchestra	taffeta		
<u>6</u>	abdomen (P-AS)	badminton (P)	bulletin	cardigan
	cannibal	coconut	emphasis	garrison
	invalid (P-AS)	mannikin	moccasin	octopus
	paraffin	Puritan	stewardess	vitamin
	wilderness			

22,2 (con't)

7

accident	afterward	afterwards	applicant
consonant	continent	excellent	immigrant
implement	impudent	incident	innocent
instrument	ornament	pharmacist	permanent
sentiment	supplement	testament	

8

accurate	adjective	alternate(Aj)	ambulance
armistice	confidence	countenance	estimate (N)
juvenile (P)	opposite	ordinance	orphanage
talkative	transitive		

22,3 Frequency = 89

Stress pattern 30 Frequency = 89

<u>1</u>	Alaska	alfalfa	angora	antenna
	bandanna	bermudas	chinchilla	crayola
	diploma	gorilla	saliva	vánilla
	veranda	victrola	umbrella	
<u>2</u>	another	December	disaster	divisor
	embroider	encounter	endeavor	November
	October	remainder	semester	September
	suspenders	together		
<u>3</u>	Chicago	contralto	flamingo	kimono
	memento	pimento	potato	tobacco
	tomato	tornado	torpedo	volcano
<u>4</u>	abandon	accustomed	appendix	asbestos
	bronchitis	domestic	elastic	electric
	embarrass	fantastic	galoshes	gigantic
	historic	horizon	indignant	interpret
	majestic	molasses	narcissus	opposum
	opponent	persimmon	romantic	toboggan
	transparent			
<u>5</u>	apostle	apparel	assemble	eternal
	illegal	immortal	orchestral	utensil
<u>6</u>	adhesive	advantage	assembly	canary
	committee	dependence	determine	employee
	infertile	intestine	percentage	productive
	remembrance	resemblance	tomorrow	

22,4 Frequency = 19

Stress pattern 3D Frequency = 19

<u>1</u>	absentee	buccaneer	chimpanzee	engineer
	halloween(P)	velveteen		
<u>2</u>	bayonet (AS)	clarinet	contradict	correspond
	entertain	impolite	intercede	interfere
	interrupt	introduce	kangaroo	mandolin
	mayonnaise (AS)			

Fourth-Year Word List

Frequency = 1129

Block 23 Frequency = 151

23.1 Frequency = 72

A29 Frequency = 29

<u>1a</u>	baste	haste	paste	taste
	waste			
<u>1b</u>	distaste	hasten	hastily	hasty
	pasteboard	paster	pastry	tasteless
	tasty	wastebasket		
<u>2</u>	arrange	arrangement	change	changeable
	exchange	mange	mangy	range
	ranger	strange	stranger	
<u>3</u>	angel	danger	endanger	

A24 Frequency = 43

<u>1</u>	wad	wan	wand	want
	wash	wasp	watch	
<u>2</u>	swamp	swan	swat	
<u>3</u>	flyswatter	swampy	swatter	unwashed
	washer	Washington	washtub	watchdog
	watchmaker	watchman	whitewash	
<u>4</u>	swallow	waffle	wallet	wallop
	walnut	walrus	wampum	wander
	wanderer	water	waterer	waterfall
	waterway	watery	wigwam	
<u>5</u>	quality	quantity	squab	squad
	squander	squash	squat	

23,2 Frequency = 48

135 Frequency = 21

<u>1a</u>	mi	ski	ti	
<u>1b</u>	confetti	Hopi		
<u>2</u>	chlorine	marine	quarentine	ravine
	sardine	submarine	tangerine	vaccine
<u>3</u>	casino	farina	mobile(P)	petticoat
	pinochle	police	policeman	polliwog

125 Frequency = 27

<u>1</u>	billion	communion	million	millionaire
	onion	pavillion	rebellion	reunion
	stallion	union		
<u>2</u>	behavior	junior	savior	senior
<u>3</u>	ammonia	begonia	magnolia	petunia
<u>4</u>	interview	review	view	viewer
<u>5</u>	brillaint	convenience	convenient	genial(P)
	peculiar			

23,3 Frequency = 31

Y11 Frequency = 8

linotype

lyre

paralyze

style

teletype

type

typewrite

typewriter

Y13 Frequency = 6

asylum

dynamite

papyrus

stylish

typist

tyrant

Y15 Frequency = 7

antonym

Brooklyn

Egypt

gym

lynch

lynx

myth

Y16 Frequency = 10

crystal

gymnastics

gypsy

hypnotize

pygmy

syllable

symbol

sympathy

symphony

system

Block 24 Frequency = 223

24,1 Frequency = 50

Four-syllable compounds Frequency = 11

brother-in-law	dictatorship	forget-me-not	huckleberry
jack-o-lantern	merry-go-round	morning-glory	relationship
San Francisco	sister-in-law	United States	

-ing Frequency = 7

appetizing	embarrassing	magnifying	merrymaking
self-governing	understanding	undertaking	

-y Frequency = 1

difficulty

-er Frequency = 6

discoverer	fertilizer	multiplier	overseer
photographer	undertaker		

-or Frequency = 8

captivator	cultivator	incubator	insulator
numerator	percolator	supervisor	ventilator

-en Frequency = 1

undertaken

-ed Frequency = 2

complicated	disappointed
-------------	--------------

-ly Frequency = 14

<u>1</u>	apparently	contentedly	disorderly	exceedingly
	excitedly	extensively	intimately	personally
	practically (P)	respectively	unwillingly	
<u>2</u>	respectfully	successfully	wonderfully	

24,2 Frequency = 89

E33 Frequency = 38

<u>1a</u>	exit	exile	Texas	
<u>1b</u>	exercise	execute	flexible	Mexican
	Mexico			
<u>2a</u>	clever	crevice	devil	ever
	levee	lever	level	levy
	never	seven	seventh	sever
<u>2b</u>	devastate	eleven	eleventh	evergreen
	evermore	evidence	evident	forever
	however	revenue	seventeen	seventeenth
	seventy	whenever	whichever	
<u>2c</u>	everlasting	evidently	Beverly Hills	

138 Frequency = 22

<u>2a</u>	civic	civics	civil	forgive
	give	giver	live(Vb)	liver
	quiver	river	rivet	shive
	sliver	shortlived	shrivel	vivid
<u>2b</u>	civilize	cod-liver	deliver	forgiveness
	liverwurst	privilege		

24,2 (con't) 38

Frequency = 21

<u>1a</u>	axis	axie	taxi	
<u>1b</u>	saxophone	taxicab		
<u>2a</u>	cavern	gravel	have	ravel
	savage	travail (P)	tavern	travel
	travels			
<u>2b</u>	avalanche	avenue	cavity	davenport
	lavender	navigate	scavenger	

038 Frequency = 8

<u>1a</u>	foxy	oxen	
<u>2a</u>	novel	proverb	ince
<u>2b</u>	poverty	providence	novelty

24,3 Frequency = 67

12,8 Frequency = 19

<u>1a</u>	magic	magical	panic	
<u>1b</u>	chromatic	dramatic	dramatics	mechanic
	volcanic			
<u>2a</u>	habit	inhabit		
<u>3</u>	banish	radish	Spanish	vanish
<u>4</u>	acid	invalid (meaning "not valid")		rapid
	rapidly	rapids		

128 Frequency = 17

<u>1a</u>	clinic	mimic		
<u>1b</u>	artistic	pacific	terrific	
<u>2a</u>	limit	spirit	spirited	visit
	visitor			
<u>2b</u>	prohibit	solicit		
<u>3</u>	diminish	finish	unfinished	
<u>4</u>	frigid	timid		

128 Frequency = 2

<u>1a</u>	physic	physics	
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24,3 (con't) 028 Frequency = 20

<u>1a</u>	chronic	comical	frolic	phonic
	phonics	tonic	topic	tropic
	tropical			
<u>1b</u>	alcoholic	atomic	masonic	
<u>2a</u>	profit	profiteer	vomit	
<u>2b</u>	deposit			
<u>3</u>	abolish	astonish	polish	
<u>4</u>	solid			

E28 Frequency = 9

<u>1a</u>	relic			
<u>1b</u>	athletic	athletics	pathetic	
<u>2a</u>	credit			
<u>2b</u>	editor	inherit		
<u>3</u>	cherish	perish		

24,4 Frequency = 17

General primary vowel Rule 27 Frequency = 17

<u>1</u>	humanity	humidity	morality	prosperity
	rapidity	vitality		
<u>2</u>	activity	captivity	hostility	nobility
<u>3</u>	ability	capacity	facility	posterity
	simplicity	stability	vicinity	

Block 25 Frequency = 240

25,i Frequency = 61

-tion Frequency = 61

<u>1a</u>	interjection	intersection	reconstruction	
<u>1b</u>	arbitration	circulation	compensation	constipation
	constitution	contribution	corporation	cultivation
	distribution	fascination	illustration	institution
	irrigation	navigation	numeration	vaccination
	ventilation			
<u>2a</u>	annexation	cancellation	confirmation	information
	transportation			
<u>2b</u>	admiration	combination	conservation	consolation
	conversation	exploration	inspiration	invitation
	observation	perspiration	respiration	
<u>3</u>	composition	disposition	exposition	opposition
<u>4</u>	application	exclamation	explanation	inflammation
	introduction	occupation		
<u>5</u>	definition	preparation	preposition	preservation
	recitation	reputation	reservation	resolution
	revelation	revolution		
<u>6</u>	ammunition	aviation	constellation	jubilation
	jurisdiction			

25,2 Frequency = 63

126 Frequency = 30

<u>1a</u>	dial	diet	giant	liar
	lion	riot		
<u>1b</u>	briar	friar	quiet	science
	trial	triumph		
<u>2a</u>	quietly	quietness	sealion	sundial
	triumphant			
<u>2b</u>	diagram	diary	iodine	liable
	pioneer	scientist	triangle	viaduct
	violate	violence	violent	violet
	violin			

Y26 Frequency = 2

cyanide hyena

U26 Frequency = 11

<u>1</u>	bluish	bruin	duet	fluid
	ruin	suet	truant	
<u>2</u>	annual	annually(P)	influence	suicide

E26 Frequency = 15

<u>1</u>	create	meow		
<u>2</u>	area	cereal	creation	idea
	leotard	meteor	museum	peony
	preamble	prearrange	reaction	rodeo(AS,P)
	theater			

25,2 (con't) 026 Frequency = 3

poem poet poetry

A26 Frequency = 2

qaity mosaic

25,3 Frequency = 37

136 Frequency = 35

1 fiord

2 curio folio polio portfolio

radio studio

3 calcium helium medium premium

radium stadium

4 alien audience barrier champion

chariot foliage Indian lariat

bania oriole period radiant

radius ruffian serial terrier

viola warrior zinnia zodiac

5 championship hurriedly

236 Frequency = 2

embryo Tokyo

25,4 Frequency = 33

A12 Frequency = 18

<u>1</u>	able	cable	cradle	fable
	gable	ladle	maple	sable
	stable	staple	table	
<u>2</u>	enable	tablecloth	tablespoon	tablespoonful
	tableware	timetable	unable	

I12 Frequency = 9

Bible	bridle	entitled	idle
idleness	idly	rifle	title
trifle			

Y12 • Frequency = 2

cycle	motorcycle
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O12 Frequency = 2

noble	nobleman
-------	----------

U12 Frequency = 2

bugle	bugler
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25,5 Frequency = 46

E14 Frequency = 20

<u>1</u>	reflect	reflection	refrain	refresh
	refreshment	regret	replace	reply
	retract	retreat		
<u>2</u>	cathedral	declare	decline	decrease
	deprive	eclipse	Negro	secret
	secretly	zebra		

114 Frequency = 9

biplane	library	microphone	microscope
migrate	migration	nitrate	tigress
vibrate			

Y14 Frequency = 4

cyclone	cypress	hydrant	hydrogen
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A14 Frequency = 6

April	apron	fragrance	patriotic
patronize(P)	sacred		

O14 Frequency = 4

okra	only	proclaim	program
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U14 Frequency = 3

duplicate(P)	lubricate	nutrition	
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Block 26 Frequency = 311

26,1 Frequency = 37

-able Frequency = 19

<u>1</u>	accountable	agreeable	available	comfortable(P)
	dependable	enjoyable	favorable	obtainable
	profitable	reasonable	remarkable	respectable
<u>2</u>	noticeable	serviceable		
<u>3</u>	adorable	desirable	excusable	valuable(P)
<u>4</u>	reliable			

-ment Frequency = 5

advertisement	astonishment	disappointment	embarrassment
entertainment			

-al Frequency = 8

<u>1</u>	continental	departmental	electrical	historical
	oriental			
<u>2</u>	congressional	emotional	professional	

-ness Frequency = 2

effectiveness	unselfishness
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-ary Frequency = 2

dictionary	missionary
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-ist Frequency = 1

violinist

26,2 Frequency = 35

IE17 Frequency = 12

<u>1</u>	birdie	brownie	cookie	kladdie
	laddie	lassie		
<u>2</u>	caddie	collie	hippie	kewpie
	mashie	prairie		

EY17 Frequency = 23

<u>1</u>	mousey	pulley		
<u>2</u>	alley	barley	chimney	donkey
	galley	hockey	honey	jockey
	money	monkey	parley	parsley
	trolley	turkey	valley	volley
<u>3</u>	honeybee	honeydew	honeymoon	honeysuckle
	volleyball			

26,3 Frequency = 10

AI17 Frequency = 10

bargain	captain	certain	certainly
curtain	fountain	mountain	mountainside
uncertain	villain		

26,4 Frequency = 18

EA33 Frequency = 18

<u>1b</u>	earn	earth		
<u>2b</u>	heard	learn	pearl	search
	yearn			
<u>4a</u>	hearse			
<u>6a</u>	earthquake	earthworm	searchlight	
<u>6b</u>	pearly			
<u>7a</u>	early	earnest	earthling	
<u>7c</u>	rehearse			
<u>8b</u>	earnestly	rehearsal		

26,5 Frequency = 54

IE12 Frequency = 39

<u>2b</u>	chief	pier	thief	
<u>4a</u>	field	fiend	niece	piece
	shield	siege	yield	
<u>4b</u>	brief	grief	shriek	
<u>5a</u>	grieve	priest		
<u>5b</u>	fierce	pierce		
<u>6a</u>	briefcase	cornfield	crosspiece	
<u>6b</u>	chiefly	fielder	fiercely	
<u>7c</u>	achieve	apiece	belief	believe
	cashier	chieftain	frontier	hygiene
	relief	relieve	wiener	
<u>7a</u>	catchfield	makebelieve		
<u>3b</u>	disbelieve	left-fielder	out-fielder	

26,5 Decet E110 Frequency = 15

<u>2b</u>	sheik			
<u>4a</u>	weird	seize		
<u>7a</u>	either (P)			
<u>7c</u>	caffeine	ceiling	conceit	deceit
	deceive	neither (P)	perceive	protein (P)
	receive			
<u>8b</u>	receiver	deceitful		

26,6 Frequency = 28

EY10 Frequency = 9

<u>2a</u>	hey	they	whew
<u>3b</u>	grey	prey	
<u>6a</u>	greyhound		
<u>7b</u>	obey		
<u>8b</u>	surveyor	disobey	

E120 Frequency = 19

<u>1</u>	neigh	sleigh	weigh	
<u>2</u>	eight	freight	weight	
<u>3</u>	reign	reins	vein	
<u>4</u>	bobsleigh	eighteen	eighteenth	eighth
	eighty	neighbor	neighborhood	neighboring
	overweight	reindeer		

26,7 Frequency = 121

-ous Frequency = 38

<u>1</u>	dangerous	humorous	joyous	marvelous
	mountainous	poisonous	prosperous	
<u>2</u>	adventurous	famous	grievous	nervous
	porous			
<u>3</u>	furious	industrious	injurious	mysterious
	studious	various	victorious	
<u>4</u>	monstrous	wondrous		
<u>5</u>	courteous	curious	enormous	jealous
	numerous	obvious	previous	rebellious ,
	serious	tedious	treacherous	tremendous
<u>6</u>	furiously	jealousy	joyously	previously
	seriously			

0031 Frequency = 26

<u>2b</u>	touch	young		
<u>6a</u>	touchdown			
<u>6b</u>	touched	touching		
<u>7c</u>	country	couple	courage	cousin
	double	doublet	flourish	journal
	journey	nourish	southern	trouble
	youngster			
<u>8a</u>	double-cross	crosscountry	troublesome	
<u>8b</u>	discourage			
<u>9c</u>	courier	encourage	tambourine	
<u>10b</u>	discouragement			

26,7 (con't) 01134 Frequency = 11

1b ought

2b bought fought nought sought
thought

4b brought

6a forethought

6b thoughtful thoughtless

8b thoughtfulness

26,8 Frequency = 8

01131 Frequency = 8

4a build built

6b builder rebuild rebuilt building

7c biscuit circuit

Block 27 Frequency = 204

27,1 Frequency = 19

un- Frequency = 8

<u>1</u>	uncivilized	unconnected	unexpected	unlimited
<u>2</u>	uneventful	unimportant	unmerciful	unsuccessful

in- Frequency = 6

	inattention	inattentive	inconvenient	independence
	independent	indigestion		

dis- Frequency = 3

	disappearance	disinfectant	disqualify
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mis- Frequency = 2

	misunderstand	misunderstood
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27,2 Frequency = 69

Stress pattern 4A Frequency = 59

<u>1a</u>	Arabia	bacteria	diphtheria(P)	malaria
<u>1b</u>	adverbial	centennial	colonial	congenial
	imperial	industrial	material	memorial
	perennial			
<u>1c</u>	appropriate(Aj)	immediate	librarian	
2	aquarium	geranium	gymnasium	linoleum
	petroleum			
<u>3a</u>	exterior	inferior	interior	superior
<u>3b</u>	ambassador	proprietor	rectangular	triangular
<u>3c</u>	artillery	dispensary	distillery	
<u>4</u>	emergency	necessity	society	transparency
	variety			
<u>5</u>	coincidence	equivalent	experience	intelligence
	intelligent	obedience	obedient	
<u>6</u>	impossible	inflammable	invincible	responsible
<u>7</u>	aluminum	arithmetic	asparagus	declarative
	diversify	extravagant	identical	intransitive
	Jerusalem	peninsula	receptacle	

Stress pattern 4B Frequency = 10

<u>1</u>	abbreviate	assassinate	communicate	inaugurate
	incorporate	interrogate	intoxicate	investigate
<u>2</u>	identify	insecticide		

27,3 Frequency = 23

Stress pattern 40 Frequency = 23

<u>1</u>	automatic	economics(P)	pancreatic	prehistoric
	scientific	supersonic	sympathetic	systematic
<u>2</u>	antitoxin	Arizona	carbohydrate	correspondence
	fundamental	horizontal	incandescent	influenza
	interference	interurban	laryngitis	locomotive
	Mississippi	multicolored	tonsillitis	

27,4 Frequency = 14

Stress pattern 40 Frequency = 14

<u>1</u>	customary	ordinary	stationary	temporary
<u>2</u>	alligator	architecture	aviator	cauliflower
	dandelion	dormitory	kindergarten	millimeter
	territory	testimony		

27,5 Frequency = 7

Other four-syllable words Frequency = 7

accuracy	automobile	charitable	navigable
meteorite	marionette	multiplicand	

27,6 Frequency = 72

E32 Frequency = 49

<u>1a</u>	bakery	bravery	every	grocery(P)
	livery	mystery	nursery	robbery
	scenery	shrubbery	silvery	slavery
	slippery			
<u>1b</u>	conference	difference	different	reverence
	reverent			
<u>1c</u>	evening	fattening	offering	
<u>1d</u>	average	bachelor	beverage	desperate
	interest	jeweler	jewelry	opera
	pickerel	porcelain	several	temperate
	traveler	vaudeville		
<u>2</u>	desparately	everyday	everything	groceryman(P)
	indifferent	interesting		
<u>3</u>	circumference	deliberate(Aj)	delivery	discovery
	embroidery	perfumery	recovery	refinery

032 Frequency = 13

<u>1a</u>	factory	hickory	history	ivory
	victory			
<u>1b</u>	Catholic	corporal	favorite	sophomore
<u>2</u>	comfortably(P)	elaborate(Aj)		
<u>3</u>	laboratory	satisfactory		

27,600 (11) 632 Frequency = 7

1 begetary diamond diaper separate(Aj)

2 elementary frantically Niagara Falls

132 Frequency = 3

1 epine cardinal

2 collared

Section III

Sequenced Irregularly-Spelled Words

Irregularly-spelled words are those words in which there is ^{at least} one case of a spelling-to-sound correspondence not included in the present set of correspondences. This section contains a sequenced listing of these words.

The sequence of irregularly-spelled words follows the rule sequence of Section II (summarized in Appendix C) and indicates the first point at which introduction of these words is recommended. (Rules for which there are no corresponding irregularly-spelled words are not listed.) For the most part the words in this section are sequenced with the correspondence rules to which they are exceptions or to which they are similar. In no case, however, are irregularly-spelled words introduced until all their component regular correspondences have been introduced. (See Volume I, Section II, for further comments on the sequencing of irregularly-spelled words.)

In this section, words are grouped within each rule according to their irregular correspondence or, in a few cases, by category (e.g., numbers). The irregular correspondences are indicated by the standard notation (Berdiansky *et al.*, 1969), i.e., spelling to the left of the arrow, pronunciation to the right, environment noted where needed; e.g., o → [ɔ]. The irregular grapheme units are underlined; e.g., do, to.

In the development of a reading program it may be necessary to introduce some irregularly-spelled words at an earlier point, to allow naturalness and interest in written material. See Cronnell (1969b) for discussion of the introduction of irregularly-spelled words in beginning reading instruction.

Recommended Order of Instruction for Irregularly-Spelled Words in First Year

Frequency = 33

Block 1

1.1

115

a u a

115

i e i e i

1.3

510

s a s as is

1.5

810

a u a bass (in music)

1.6

116

i e i hi

e a has his

15

i e i o

e a do to

511

i e i the

Block 2

2.1

117

e a been

2.2

117

e a bye dye eye

eye

e a eve

Recommended Order of Instruction for Irregularly Spelled Words in Second Year

frequency = 110

Block 5

5,1

Compounds

l → / rd → windmill

o → into o onto

Block 6

6,1

all are → ar are

III cardinal numbers:

irregular one [wʌn]
two [tu]

regular by FY rules: four seven eight

(regular by present rules: three five six
nine ten)

6,2

e → ee

ere → ere were

Block 7

7,1

III o → o once

6,

6,

grandma(P) grandpa(P)
also n → n, d → 0, a → a

Block 9

9,2

E21 th → [θ] / __er: ether panther

I21 t → [tʃ]: T-shirt

Block 10

10,1

E17 o → [ɒ]: swollen

o → [ɪ]: women

A17 o → [ʊ]: woman

e → [e]: mesa

O17 ordinal numbers:

irregular. e → [ɪ] / __CV: second
i → [aɪ]: ninth

regular by FY rules: fourth seventh eighth

(regular by present rules: first third

fifth sixth tenth)

10,2

F17 i → [ɪ] / __nd: windy

a → [ɪ] any

th → [θ]: worthy

u → [ɪ]: bury

e → [ɪ]: pretty

EE22 e → [ɪ] / __C: muscle

10,4

E11 s → [ʃ]: sure sure surely

A25 toward → tɔːrd

12.3

- 12.1 u → /__/: cuckoo
- 12.2 oo → /__/: blood blooded bloody
flood
- oo → /__r/: door doorstep doorway
floor indoor
- ye → /__/: goodbye

Block 13

13.1

- 13.1 u → /__v/: improve move
prove
- i → /__/: of
- wh → /__/: wholesome
- ne → /__v/: someone
- u → /__/: somewhat
- ere → /__/: somewhere

- 13.2 u → /__/: sugar

13.2

- 13.3 a → /__ll/: shall
- a → /__/: waltz

- 13.4 o → /__/: begone golf gone

13.3

- 13.5 e → /__st/: almost (also all → al)
host most monthly
post postal poster
postman

13,3 count

o → /__l control holster patrol

o → /__ss gross

o → /__th both

31 or 14

a → cleanse cleanser clumsy

cosmos husband muslin

pansy plasma Thursday

wisdom

a → /__l false

—

Frequency = 615

1

5

Block 16

16,1

AI10	<u>ai</u> → [ɪ]:	ag <u>ai</u> n	ag <u>ai</u> nst	s <u>ai</u> d
	<u>ai</u> → [e]:	pl <u>ai</u> d		
	<u>ai</u> → [ay]:	ka <u>ai</u> k		

16,2

OU10	<u>oo</u> → [ɔ]:	out <u>oo</u> r
	<u>oo</u> → [ʊ]:	bl <u>oo</u> dhound

16,3

OE10	<u>oe</u> → [u]:	can <u>oe</u>	horsesh <u>oe</u>	sh <u>oe</u>	sh <u>oe</u> horn
		sh <u>oe</u> lace	sh <u>oe</u> string	snowsh <u>oe</u>	
OA10	<u>oa</u> → [ɔ]:	ab <u>oa</u> d	br <u>oa</u> d	br <u>oa</u> dcast	
		br <u>oa</u> dcloth	br <u>oa</u> dway		

16,4

AW10	<u>er</u> → [r]:	draw <u>er</u>	
AU10	<u>au</u> → [æ]:	<u>au</u> nt(P)	<u>au</u> nty(P)
	<u>u</u> → [ɪ]:	S <u>an</u> ta Claus	

16,6

UE10	<u>ue</u> → [u] [u]:	tr <u>ue</u> th	tr <u>ue</u> thful	
	<u>ue</u> → Ø, <u>ng</u> → [ŋ]:	t <u>ue</u> ngue		
	<u>u</u> → [ɪ]:	T <u>ue</u> sday		
EW10	<u>ew</u> → [ɪ]:	s <u>ew</u>	s <u>ew</u> er	
	<u>eu</u> → [(y)u]:	<u>Eu</u> rope	grand <u>eu</u> r	neut <u>eu</u> ral

Block 18

13,1

E13 e → [ɛ] / __CV.

dec <u>ade</u>	del <u>uge</u>	her <u>al</u> d	her <u>on</u>
leg <u>end</u>	le <u>m</u> on	le <u>m</u> onade	me <u>d</u> al
me <u>l</u> on	me <u>n</u> ace	me <u>t</u> al	pe <u>d</u> al
per <u>i</u> l	pe <u>t</u> al	pre <u>f</u> ace	re <u>b</u> el (N)
re <u>c</u> ord (N)	re <u>f</u> uge	se <u>c</u> ond	se <u>c</u> ondhand
se <u>n</u> ate	she <u>r</u> iff	te <u>n</u> ant	

e → [i] / __ch V: recharge

n → [ɲ]: senor (P) (also e → [e]: senor)

o → [u]: remove

013 o → [ɔ] / __CV

any <u>bo</u> dy (also <u>a</u> → [ɔ])	bo <u>d</u> ily	bo <u>d</u> y
co <u>me</u> t	co <u>p</u> y	mo <u>d</u> el
no <u>bo</u> dy	o <u>l</u> ive	pro <u>ce</u> ss
pro <u>p</u> er	pro <u>p</u> erly	ro <u>b</u> in
vo <u>l</u> ume		so <u>me</u> bo <u>d</u> y

oe → [ɔ]: overshoe

013 a → [ɛ] / __CV

ag <u>a</u> te	at <u>o</u> m	ba <u>b</u> oon (P)	ba <u>l</u> ance
ca <u>b</u> in	ca <u>f</u> e (also <u>e</u> → [e] / __#)		ca <u>m</u> el
cha <u>p</u> el	da <u>m</u> age	dra <u>g</u> on	fra <u>g</u> ile
ta <u>n</u> ine	gra <u>n</u> ite	La <u>t</u> in	ma <u>d</u> am
ca <u>l</u> ico	ma <u>n</u> age	ma <u>n</u> ager	pa <u>l</u> ace

18,1 (cont.)

<u>panel</u>	<u>patent</u>	<u>planet</u>	<u>salad</u>
<u>satin</u>	<u>Saturn</u>	<u>shadow</u>	<u>snapdragon</u>
<u>strata</u>	<u>taboo</u>	<u>talent</u>	<u>talented</u>
<u>trapeze</u> (P)	<u>wagon</u>	<u>wagonload</u>	
<u>vacuum</u> (also <u>uu</u> → [ʒ])	<u>valor</u>	<u>value</u>	
<u>a</u> → [a]: <u>amen</u>	<u>drama</u>	<u>lava</u>	<u>llama</u>
<u>plaza</u>			

113 i → [ɪ] / __CV:

<u>city</u>	<u>figure</u>	<u>image</u>	<u>linen</u>
<u>liquid</u>	<u>lizard</u>	<u>minute</u> (N)	<u>minuteman</u>
<u>primer</u>	<u>pity</u>	<u>sinew</u>	<u>spigot</u>
<u>spinach</u>	<u>tribute</u>	<u>vigor</u>	<u>widow</u>
<u>lizard</u>			
<u>iron</u> → [ʔɔɪn]	<u>iron</u>	<u>flatiron</u>	

113 u → [ʊ] / __CV

<u>suburb</u>	<u>study</u>
<u>rh</u> → [r]: <u>rhubarb</u>	

15,

120 a → [ɔ] / __V

<u>abuse</u> (N)	<u>aside</u>	<u>basis</u>	<u>bison</u>
<u>close</u> (Adj)	<u>closely</u>	<u>crusade</u>	<u>crusader</u>
<u>goose</u>	<u>excuse</u> (N)	<u>geese</u>	<u>mason</u>
<u>nuisance</u>	<u>promise</u> (also <u>a</u> → [ɔ] / __CV)	<u>purpose</u>	
<u>sausage</u>	<u>usage</u>	<u>use</u> (N)	<u>useful</u>
<u>useless</u>	<u>vise</u>		
<u>also</u> <u>oi</u> → [ɔɪ]	<u>porpoise</u>	<u>tortoise</u>	

18,2

$V \rightarrow [V] / _ CV$

ch <u>i</u> sel	clo <u>s</u> et	de <u>s</u> ert (N)	pr <u>i</u> son
pr <u>i</u> soner	pr <u>e</u> sence	pr <u>e</u> sent (N)	pr <u>e</u> sently
ri <u>s</u> en	ro <u>s</u> in	vi <u>s</u> it	

$\underline{e} \rightarrow [e] : \text{lose} \quad \underline{wh} \rightarrow [h] \text{ (also } \underline{wh} \rightarrow [n])$

$\underline{b} \rightarrow [b] : \text{bosom (P)}$

$\underline{u} \rightarrow [u] : \text{business (also } \underline{i} \rightarrow \emptyset) \quad \text{busily} \quad \text{busy}$

$\underline{n} \rightarrow [n] / _ [f] : \text{enclose} \quad \text{inclose}$

$\underline{ss} \rightarrow [s] : \text{dessert} \quad \text{dissolve} \quad \text{possess} \quad \text{scissors$

021 $\underline{s} \rightarrow [z] / \text{ea} _ \underline{e} : \text{disease} \quad \text{displease} \quad \text{ease}$

$\underline{p} \rightarrow [p] : \text{please} \quad \text{tease}$

$\underline{z} \rightarrow [z] / \text{ou} _ \underline{e} : \text{arouse} \quad \text{house (Vb)} \quad \text{rouse}$

$\underline{z} \rightarrow [z] / \text{oo} _ \underline{e} : \text{choose}$

$\underline{a} \rightarrow [a] / _ CV : \text{papose}$

18,3

022 $\underline{y} + \underline{aq} \rightarrow \underline{nge} \text{ (also } \underline{y} \rightarrow [j]) : \text{carriage} \quad \text{marriage}$

18,4

025 $\underline{all} \rightarrow \underline{al} [ɔl] : \text{also}$

$\underline{ere} \rightarrow \text{nowhere}$

$\underline{u} \rightarrow [u] / _ \# :$

fluu $\text{menu (also } \underline{e} \rightarrow [e] / _ CV)$

Block 19

19,1

-ment a → [ɪ] / __CV: management
 ue → u [yu]: argument
-ive s → [ɪ] /V__V: abusive
-ness ue → u [u]: truthfulness

19,2

124 + GH10

all → al [ɔɪ]. airight
eye → [aɪ]: eyesight
o → [ɔɪ] / __CV: copyright

GH10

gh → [g] / #: ghost ghostly
gh → [f]; au → [ɔɪ]: draught laugh laughingly
 laughter

H20 ah → [ɔɪ] / __#: ah bah hurrah
 rah rajah (also a → [a]) yah
eh → [e], [ɛ]: eh
o → [ɔɪ] / __CV: homage honest honestly
 honor

19,3

H20 oo → [o]: doorknob
ow → [ɔɪ]: knowledge

19,3 (con't) G20 i → [i] / __gn#: ensign

u → [u] : colugne

W20 u → Ø : answer sword

19,4

B20 b → Ø / __t : debt doubt doubtful doubtless

i → [aɪ] : climb

u → [ʊ] : comb

u → [u] : tomb

19,5

T20 ould → [ʊd] : could should would

a → [ɑ] / __m : almond calm palm

i → Ø : Lincoln solder

colonel → [kɔrnel]

T20 i → Ø : chestnut mortgage

ot → [ɑ] : depot

et → [ɑ] : ballet buffet valet (also a → [ɑ] / __CV)

19,6

G20 i → [i] / __CV : guinea guitar

u → Ø : disquise

u → [w] / ...g__ : jaguar (also a → [ɑ] / __CV) language

penquin

u → [w] : persuade

y → [ɪ] : buy buyer guy

u → [u] / __ : language plaque roque

19,6 (cont.) que → [k] / __#: nosque
qu → [k]: conquer croquet (also et → [e] / __.)
 turquoise
 also V → [Ṽ] / __CV: laquer liquor

Other silent letters

d: d → Ø / a__j: adjoin adjust adjustment
 d → Ø: handsome
n: n → Ø/m__#: autumn
 also o → [ə] / __CV: column solemn solemnly
p: p → Ø / __b; oa → [ə]: clapboard cupboard
 p → Ø / # __C (C ≠ r, l); a → [ə] / __lm: psalm
 corps → [kor]

Block 20

20,1

-y V → [Ṽ] / __CV: honesty sinewy
 s → [ʃ]: sugary
-ful i → [ɪ] / __CV: pitiful
-al o → [ʊ] / __v: approval removal
 u → [ɪ]: burial (y → i [ɪ])
-able o → [ʊ] / __v movable (optional Ø)

20,2

PHIO V → [Ṽ] / __phV: cipher gopher siphon
 trophy
 pph → [f] sapphire

20,2 (con't) CH31

ache → [æk]. ache backache earache
toothache stomachache
v → [v̥] / __CV: chemist monarch monarchy
 scholar
n → [ŋ] / __ch: anchor
i → [ay]: Christ
t → Ø: Christmas
choir → [kwaɪr]
ch → [ʃ]: chamois (also a → [æ] / __CV; ois → [i])
 chauffeur (also au → [o]; eu [ə]) chef
 chute mustache
 also et → [e]: chaet (also a → [æ] / __CV)
 crochet (also o → [o] / __chV) sachet

20,3

TH12

v → [v̥] / __the?: bathe clothe
a → [ɜ]: father forefather grandfather stepfather
th → [θ]: clothing (also ɜ → [o] / __thV) fathom heathen
 smooth smoothly swarthy
clothes → [ˈkloʊz]: clothes clothesbasket clothesline
 clothespin underclothes
th → Ø: sthmus

Block 21

21, 1

dis- o → [ə] / CV: dishonest dishonor

re- 0 → [ɜ] / CV: remodel

21,2

-tion i → {i} / tion: addition condition edition

partition position

a → [a] / _tional: national rational

21,5

-sion i → [ɪ] / CV: vision

21,4

- ture a → [a] / CV: stature natural

Block 22

22,1

Stress pattern 3B

$$V \rightarrow [\check{V}] / CV$$

anecdote aqueduct botolink calico

celebrate criticize crocodile decorate

dedicate democrat demonstrate dividend

dominate domino dramatize elevate

generate gratitude hemisphere hesitate

holiday imitate kerosene latitude

mini-ure manu-cript remote redemptio- (ed.)

modify nominate operate pacify

penetrate populate ratify recognize

22,2 (cont'd)

miracle	misery	moderate (A1)	monitor
neg <u>a</u> nt	neg <u>a</u> tive	pelican	pl <u>a</u> teau
pol <u>i</u> cy	pop <u>u</u> lar	pos <u>i</u> tive	pred <u>i</u> cate
pres <u>i</u> dent	prim <u>i</u> tive	prob <u>a</u> ble	prob <u>a</u> bly
prom <u>i</u> nent	prop <u>o</u> erty	reg <u>i</u> ment	requ <u>i</u> re
reg <u>u</u> lar	rel <u>a</u> tive	rem <u>e</u> dy	res <u>i</u> dence
res <u>i</u> dent	sen <u>a</u> tor	sim <u>i</u> lar	skele <u>t</u> on
spec <u>i</u> men	tape <u>s</u> try	ten <u>e</u> ment	van <u>i</u> ty
vinegar	vis <u>i</u> ble		

e → [i] / __CV; e → [i] / __: recipe

re → [e] / __: massacre

a → [a] / __: marshmallo

s → [e] / V__V: fuselage (P)

pleurisy (also eu → [y])

z → [z], p → [p] / __b: raspberry

22,3

Stress pattern 30

V → [V] / __CV.

ab <u>a</u> cus (P,AS)	alp <u>a</u> ca	ban <u>a</u> na	comp <u>o</u> site
cons <u>i</u> der	cont <u>i</u> nu <u>e</u>	contrib <u>u</u> te	devel <u>o</u> p
distrib <u>u</u> te	en <u>a</u> mel	exquis <u>i</u> te	imag <u>i</u> ne
impr <u>i</u> son	improp <u>o</u> er	paj <u>a</u> mas	re <u>u</u> nder
septr <u>a</u> no			

e → [e] / __: adobe

corote (P)

also a → [a]: karate

terape

tarach

o → [o]: acknowledge

d → [d] / __j: adjacent

all → [al] almighty

Recommended Order of Instruction for Irregularly-Spelled
Words in Fourth Year

Frequency = 384

Block 23

23,1

A29 a · [e] / __CC: chamber

A24 ea · [e]: breakwater

23,2

135 V · [Ṽ] / __CV: chili gasoline khaki (also kh · [k])

magazine vasoline

z · [s] /V __Ṽ valise

ue · Ø /g __#: fatigue

que · [k] / __: antique unique

qu · [k]: mesquite mosquito

u · [w] suite

ch · [ʃ] machine

gh · [n]: spaghetti

zz · [t]: pizza

ll · [ɹ] tortilla

ai · [aɪ] Hawaii

125 h · Ø dahlia (or a · [e], h · Ø dahlia)

shion · [ʃən] cushion fashion old-fashioned

p · Ø /: __C (C ≠ r, i), eu · [u] pneumonia

V · [Ṽ] / __CV companion dominion familiar

opinion spaniel Virginia

[illegible]

1

1

1

24,1 (con't) -or V = [Ũ] / __CV: elevator generator operator
 regulator separator seculator
 -ly V = [Ũ] / __CV definitely moderately regularly
u = Ø / __t: undoubtedly

24,3

E38 a = [ə]: whatever
ere = [ɛ]: wherever
who = [hɔ]: whoever

U28 u = [ʌ] / __C ish: punish punishment

24,4

General primary vowel Rule 27

u = [ʊ] / __C ity (Rule U13): community security
u = [ɔ] / __C ity (Rule U21) authurity (also au = [ɔ]) majurity
u = [ɪ] (Rule A24) equaluity

Block 25

25,1

-tion V = [Ũ] / __CV benediction celebration decoration
 dedicution demonstration elevation
 generation hesitation imitation
 legislation operation population
 regulation resurrection salutation
 sanitation satisfaction separation
 vegetation
i = [ɪ] / __tion exhibition expedition
 recognition (also e = [ɛ] / __CV)

25,2

- 126 ue · Ø /g__#: dialogue
- U26 V · [ŷ] /__CV: genuine manual minuet
oy · [i]: buoy (or buoy · [boy])
- E26 V · [ŷ] /__CV: linear stereo
- O26 e · [ɛ] /__CV: heroine

25,3

- I36 V · [ŷ] /__CV: idiot patio piano
pianist(P)
- o · [ɔ] /__thV, th : [ó]: clothier
- ae · [ɛ]: aerial

25,4

' A12, 012

- re · [ɔr] /C__#: acre ogre
- Y12 y · [ɪ] /__Cler: bicycle tricycle

25,5

- E14 e · [ɛ] /__C^r V: leprechaun petrify
pueblo (also u · [w]) recreation
represent
- I14 ɛ · Ø isle island
- O14 o · [ɔ] /__C^r V: proclamation progress
- U14 u · [ɔ] /__CIV: public publication publish
publisher quintuplet republic
- A14 a · [ɛ] /__C^r V acrobat acrobatic Africa
apricot(P) declaration establish
sacrifice

Block 26

26,1

-able V · [ʌ] / __CV: honorable manageable miserable
preferable

shion · [ʃən]: fashionable

-ment V · [ʌ] / __C(l)V: development establishment

-al V · [ʌ] / __CV: additional mechanal

-ist o · [a] / __CV: pathologist

26,2

IE17 a · [ɛ] / __CV: calarie

au · [ɔ]: auntie (P)

o · [ʊ] / __V: move

EY17 s · [ɜ]: jersey

o · [ə] / __r: attorney

26,3

AI17 ea · [e]; i · [ɪ] / __CV: Great Britain

26,4

EA33 s · [ɜ] / V __V: research

ea · [ɪ] in unstressed syllables.

pageant (also a · [ɛ] / __CV)

sergeant (also e · [ɜ])

vengeance

26,5

IE12 ie · [ɪ]: handerchief (also d · [ʌ] (P)) kerchief

mischief sieve

a · [ɪ]: rabies series

26,5 (cont.) ie r friend friendly friendship
unfriendly

ie · [v] fiery

1 - [1] / nd : windshield

ch · [ʃ]: chandelier

[illegible]ei · [1] · counterfeit forfeit

ei = 1, 2: height

ei . 1 heifer

p. 8 / receipt

ei → [e] in unstressed syllables: foreign

26.6

EY 0 ey · i j. key keyboard keyhole

by [redacted] [redacted]: geyser

26.1

-ous / Y / CV generous hideous perilous
vigorous

mischievous

01131 $y = [\check{y}] / CV$ Plymouth

, · [] /V _V: courtesy

gh = 't', enough rough roughly
tough

ch . ' ' ' moustache

0035 all - al [a:l] although

$$s = \{ \cdot \} / V \quad V \quad \text{resource}$$

qu = [k]; et = [e] / __. bouquet (P)

26,7 (con't) 0033 ou - [ʊ]: boulevard

g - [ʒ]: rouge

0034 gh - [t]: cough trough (or gh - [θ])

Block 27

27,1

in- v - [ṽ] / __CV: incredible invisible

dis- a - [ʔ] / __CV: dissatisfied

27,2

Stress pattern 4A

v - [ṽ] / __CV: academy affiliate(N) America
American amphibian anonymous
apology astronomer astronomy
barometer certificate continuous
diagonal diameter divisible
economy experiment geometry
harmonica imperative inadequate
indelible inquisitive irregular
magnificent mahogany meridian
monogamy monopoly municipal
original particular perimeter
philosopher political
rhinoceros (also rh - [r]) ridiculous
speedometer thermometer(P)

v - [ṽ] / __C, [r] -v: biography democracy geography
republican stenographer

χ - [s]; s - [s] / V __V: chrysanthemum

27,2 (cont) Stress pattern 4B

V = [Ṽ] / __CV:	accom <u>o</u> date	aff <u>i</u> liate (Vb)	ant <u>i</u> cipate
	ap <u>o</u> logize	comm <u>e</u> orate	cons <u>o</u> lidate
	co <u>o</u> perate	del <u>i</u> berate (Vh)	el <u>a</u> borate (Vb)
	ev <u>a</u> porate /	hom <u>o</u> genize	in <u>o</u> culate
	part <u>i</u> cip <u>a</u> te		

27,3

Stress pattern 4C

V = [Ṽ] / __C(r)V:	an <u>e</u> sthetic	Cal <u>i</u> ifornia	Col <u>o</u> rado
	Col <u>i</u> seum		epid <u>e</u> m <u>i</u> c
	gl <u>a</u> diolus	macar <u>o</u> ni	man <u>u</u> facture
	mat <u>h</u> ematics	mem <u>o</u> randum	oper <u>e</u> tta
	penicill <u>i</u> n	psy <u>ch</u> ed <u>e</u> lic (also p <u>er</u> / __C)	
	sem <u>i</u> colon		
	tap <u>ro</u> ca		

e = [e] senorita (also n = [ny]) (P)

ukelele (also e = [i] / __:)

all = all / __: altogether

27,4

Stress pattern 4D

V = [Ṽ] / __C(r)V:	ag <u>r</u> iculture	cater <u>n</u> pillar (also p <u>er</u> / __C)	
	ce <u>m</u> etery	ce <u>r</u> emony	dro <u>m</u> edary
	Feb <u>r</u> uary	hel <u>i</u> copter (P)	Jan <u>a</u> ry
	leg <u>i</u> slative	lit <u>e</u> rary	mel <u>a</u> ncholy
	mil <u>i</u> tary	mill <u>i</u> ner <u>y</u>	mon <u>a</u> st <u>e</u> ry

27,4 (con't)

n <u>e</u> cessary	p <u>o</u> me <u>g</u> ra <u>n</u> ate	ra <u>g</u> amuff <u>i</u> n
sa <u>n</u> itary	se <u>c</u> ondary	se <u>c</u> retary
se <u>m</u> inary	so <u>l</u> itary	sta <u>t</u> ion <u>e</u> ry
ta <u>b</u> erna <u>c</u> le	te <u>l</u> evi <u>s</u> ion	tri <u>b</u> utary

e · [e]: carburetor

27,5

other four-syllable words

-lsm · [ɪzəm] / __#:

communism rheumatism (also rh · [r], eu · [u])

also V · [Ṽ] / __CV: catechism criticism

V · [Ṽ] / __CV: capitalize equitabe literate

mademoiselle (also oi · [ə]) miniature

27,6

E32 V · [Ṽ] / __CV: adenoid adenoids camera

celery emerald everybody

federal general generally

liberat reference vegetable

veteran

e · [ɪ]: sovereign

ch · [ʃ]: machinery

one · [wɪn]: everyone

e · [ɪ]: everywere

032 V · [Ṽ] / __CV: broccolli chocolate(P)

licorice (also c · [ʃ]) memory

27.6 (cont.) 432 $\tilde{V} \rightarrow \tilde{V} / _ CV$ salary separate separately

$\underline{t} \rightarrow \emptyset, \underline{t} \rightarrow \emptyset$ sarsaparilla (P)

$\underline{a} \rightarrow \emptyset$ caramel (P)

132 $\underline{a} \rightarrow \emptyset / _ CV$ family

Additional irregularly spelled words

(See also Section V)

eau $\rightarrow \emptyset$ bureau plateau (also $\underline{a} \rightarrow \emptyset / _ CV$)

eau $\rightarrow y$ beautiful beautifully (P) beautify
beauty

eo $\rightarrow \emptyset$ in unstressed syllables: dungeon

uncheon pigeon (also $\underline{t} \rightarrow \emptyset / _ CV$)

surgeon

ee $\rightarrow \emptyset$ people

eo $\rightarrow \emptyset$ leopar

et $\rightarrow \emptyset$ ballet buffet

$\underline{x} \rightarrow \emptyset / \text{unstressed } _ V$ exact exale

exam example exart

exhast exhibit exist

existence

also $\tilde{V} \rightarrow \tilde{V} / _ CV$: examination

examine executive

ie $\rightarrow \emptyset$ sundae

aa $\rightarrow \emptyset$ bazaar

au $\rightarrow \emptyset$ restaurant

monsieur $\rightarrow \emptyset$ (not in CV)

aisle $\rightarrow \emptyset$ (not in CV)

Section II

Sequenced Proper Names

In Cronnell (1969a) nearly 500 proper names (primarily first names, but some surnames) were listed for use in beginning reading instruction. In this section these names are sequenced according to the rule sequence as found in Section II (summarized in Appendix C). Each name is introduced as an exemplar of a spelling-to-sound correspondence when all other correspondences in the name have been previously introduced. (If a rule has no name exemplars, it is not listed in this section.)

Following the sequenced names, irregularly-spelled names are sequenced, using the same methods as used in Section III for irregularly-spelled words.

Sequenced Proper Names for First Year

Frequency = 65

Block 1

1,1

N10, NN10, T10, A15

Ann

Nan

Nat

1,2

P10 Pat

1,3

L10 Al Eli

S10 Stan

1,4

J10 Dan Sid

E15 Ed Les Len Ned Ted

1,5

M10 Matt Mil Milt Pam Sam Tim

B10 Bill Ben

D15 Bud Dud

1,6

R10 Rob Ron

H10 Hill

G15 Bob Don Dot Tod Tom

Block 2

2,2

TH11 Beth Smith

Block 3

3,1

EE19 Lee

Block 4

4,1

FL0 Fran Fred

WL0 Will

4,2

KL0 Ken Kent

HL0 Hank Frank

CL2 Cal Mac Scot

CH0 Dick Mack Nick Rick

4,3

GL2 Glen Glenn Green Greg Glen

4,4

JI0 Jack Jan Jeff Jill Jim Jon

XI0 Max Rex

4,5

VI0 Bev Van Vic

Sequenced Proper Names for Second Year

Frequency = 159

Block 6

6,1

A11	Dale	Dave	Jake	Jane	Kate
I11	Mike				

6,2

O11	Hope				
U11	June				
E11	Eve	Pete	Steve		

Block 7

7,1

C11	Bruce	Grace
G11	Gene	

Block 9

9,1

A21	Art	Bart	Carl	Clark	Karl	Mark
U21	Burt	Curt	Kurt			
I21	Kirk					
E21	Bert	Ferb	Sherm			

9,2

E21	Albert	Herbert	Miller
U21	Turner	Wilbur	
A21	Arthur	Parker	

Sequenced Proper Names for Second Year

Frequency = 159

Block 6

6,1

A11	Dale	Dave	Jake	Jane	Kate
I11	Mike				

6,2

O11	Hope			
U11	June			
E11	Eve	Pete	Steve	

Block 7

7,1

C11	Bruce	Grace
G11	Gene	

Block 9

9,1

A21	Art	Bart	Carl	Clark	Karl	Mark
U21	Burt	Curt	Kurt			
I21	Kirk					
E21	Bert	Ferb	Sherm			

9,2

E21	Albert	Herbert	Miller
U21	Turner	Wilbur	
A21	Arthur	Parker	

Block 10

10,1

117	Alvin	Calvin	Dennis	Doris	Francis	Martin
	Marvin	Melvin				
017	Edmund					
E17	Agnes	Alfred	Allen	Ellen	Ernest	Ethel
	Frances	Kenneth	Mildred	Warren		
A17	Allan	Anna	Bernard (P)		Brenda	Cora
	Donna	Edgar	Edna	Edward	Ella	Emma
	Herman	Linda	Lora	Marsha	Martha	Nora
	Norma	Sandra	Sherman	Stella	Thelma	
017	Arnold	Burton	Clifford	Gordon	Milton	Nelson
	Victor	Wilson				

10,2

Y17	Abby	Andy	Becky	Betsy	Betty	Billy
	Bobby	Buddy	Cathy	Cindy	Danny	Denny
	Gerry	Ginny	Henry	Holly	Jerry	Jimmy
	Kathy	Kenny	Lanny	Molly	Nancy	Nicky
	Patsy	Patty	Penny	Polly	Randy	Sally
	Sammy	Sandy	Sherry	Terry	Tommy	Vicky
	Wendy					

10,4

A21	Arlene	Marlene		
EE10	Cathleen	Doreen	Kathleen	Noreen

10,5

E17	Jerome
-----	--------

Block 11

11,2

CH10 Chuck Richard

11,3

WH10 White

11,4

GG10 Peggy

11,6

G31 Gertrude Gil Gilbert

Block 12

12,1,

AY10 Fay Gay Jay Kay May Ray
Raymond Taylor

12,2

EA11 Bea Dean Jean Neal

12,5

OW12 Brown Howard

Block 13

13,2

A23 Walt Walter

13,3

024 Ross

Block 14

Annette Constance Faye Florence Moore
Vance Wayne

Sequenced Proper Names for Third Year

Frequency = 95

Block 16

16,1

AI10 Claire Craig(P) Faith Gail Lorraine

16,3

OE10 Joe

OA10 Joan

16,4

AW10 Lawrence

AB10 Laura Maureen Maurice Paul Paula Saul

16,5

OY10 Boyd Joy Joyce Lloyd Roy

16,6

UE10 Sue

EW10 Andrew Lew Lewis Stewart

Block 17

17,2

-5 Charles James Jones

Block 18

18,1

E13 Edit Elaine Eva Peter Vera

O13 Lola Roland Tony

A13 Ada Amy David Davis Hazel Jacob Mabel Nathan

I12 Irene

U13 Hubert Judith Judy Lucy Rudy

18,2

S20 Joseph(P) Lisa(P) Rose Susan Susanne

18,3

A22 Barry Carol Carole Cary Clara Gary Harold
Harry Karen Larry Mary Rosemary Sara Sharon

18,4

025 Jo Margo

Block 19

19,2

H20 John Johnny Johnson Sarah

Block 20

20,2

PH10 Phil Phillip Ralph Randolph(P) Rudolph(P)
CH31 Chris

Block 22

22,2

Stress pattern 3A

Allison Anderson Anthony Benjamin Christopher
Jacqueline Jennifer Jessica Peterson

22,3

Stress pattern 3C

Dolores Loretta Melissa Priscilla Rebecca Roberta

Sequenced Proper Names for Fourth Year

Frequency = 103

Block 23

23,1

A24

Wanda

23,2

I35

Anita

Bernice

Christine

Josephine (P)

Lucille

Pauline

Rita

Toni

I25

Cecilia

Celia

Julia

William

Williams

23,3

Y11

Clyde

Y15

Carolyn

Cathryn

Gwendolyn

Kathryn

Lynn

Marilyn

Y16

Phyllis

Block 24

24,2

E38

Beverly

Evan

Kevin

Block 25

25,2

I26

Brian

U26

Stuart

E26

Andrea

Beatrice

Leon

Theodore

U26

Joanna

Joanne

Joel

Lots

25,3

I36

Cynthia

Gloria

Harriet

Lillian

Marion

Sylvia

Victoria

Vivian

25,5

A14

Adrienne

April

Block 26

26,2

IE17	Annie	Archie	Bernie	Bessie	Bobbie
	Bonnie	Carrie	Cathie	Charlie	Connie
	Eddie	Ellie	Elsie	Ernie	Freddie
	Howie	Jackie	Jeannie	Jennie	Julie
	Katie	Laurie	Leslie	Margie	Nellie
	Robbie	Ronnie	Susie		
EY17	Audrey	Dudley	Harvey	Jeffrey	Mickey
	Rodney	Shirley	Sidney	Stanley	

26,4

EA33 Earl

26,5

E110 Keith Neil Sheila

26,7

OU31	Doug	Douglas	Young		
OU33	Lou	Louie	Louis	Louisa	Louise

Block 27

27,6

E32	Catherine	Evelyn	Katherine	Margery
A32	Barbara	Margaret		
O32	Dorothy	Marjorie	Nicholas	

SEQUENCED IRREGULARLY-SPELLED PROPER NAMES

Recommended Order of Instruction for Irregularly-Spelled Proper Names in Third Year

Frequency = 37

Block 16

16,6

EW10 eu → [yu]: Eugene Eunice

Block 18

18,1

E13 e → [ɛ] / __CV: Eric Helen

O13 o → [ə] / __CV: Donald Robert Roger Ponald

A13 a → [æ] / __CV: Adam Alan Alex Alice Janet Janice

a → [ɜ]: Lana

a → [e] / __chV: Rachel

18,4

O25 u → [u] / __#: Stu

Block 19

19,2

GH10 u → [yu]: Hugh

19,5

L20 l → Ø: Malcolm

Block 20

20,2

PH10 e → [i] / __phV; ph → [v]: Stephen

CH31 ch → [ʃ]: Charlene Charlotte Michelle

20,3

TH12 th → [t]: Esther Thomas (also o → [ɪ] / __CV) Thompson

tth → [θ]: Matthew

Block 22

22,1

Stress pattern 3B

$V \rightarrow [\check{V}] / __\text{CV}$ Abigail Isabel

22,2

Stress pattern 3A

$V \rightarrow [\check{V}] / __\text{CV}$: Emily Gregory Jonathan Madeline
 Oliver Pamela Timothy

22,3

Stress pattern 3C

$\underline{th} \rightarrow [t]$; $\underline{s} \rightarrow [s] / V __\text{V}$: Theresa

Recommended Order of Instruction for
Irregularly-Spelled Proper Names in Fourth Year

Frequency: 1-23

Block 23

23,2

136 Eloseph / __CV

e / __CV: Geraldine

136 V / __CV Daniel

Virginia

Block 25

25,2

126 a / __CV Diana

Diane

126 a / __CV Samuel

25,5

114 e / __CrV Debra

114 a / __CrV Patrick

Block 26

26,2

111 ie in unstressed syllables Marie

a / __CV Natalie

Valerie

26,4

133 ie in unstressed syllables

Eleanor (also e / __CV) Jeanette

26,5

112 ee Eileen

Block 2/

27,0

Err e /__CV Frerrerick

orr e /__CV orrborah

27,2

Stress pattern 4A

v /__CV Elzabeth Nathaniel

Penlope (also e /__CV)

27,3

Stress pattern 4B

a /__CV alexander

Miscellaneous

cia /__CV Marcia Patriccia (also e /__CV)

a /__CV Rua

i /__CV de Michael

de /__CV de

ge /__CV Leoard

ge /__CV george

Section V

Unsequenced Individual Word

Frequency = 245

Eighty-eight words appear in Sections II to IV of this book. There are a number of words which were not sequenced. Because of the variety of these materials, it was decided to present them all in one section, rather than to attempt to sequence them (as, for example, in the 1-20). Irregularly-spelled words are included, with the irregular vowels not covered by the mostly exceptions to general primary vowel spelling.

Section V - Hard Words - Frequency = 108

Hard words involving fifteen- and six-syllable words have been placed in blocks 1-27. The only new thing is increased complexity.

Section - Hard Words - Frequency = 99

Five-syllable words with affixe - Frequency = 62

<u>-tion</u>	civilization	• admin <u>i</u> stration	association(P)
	civilization	communication	• conf <u>e</u> deration
	co <u>o</u> peration	den <u>o</u> mination	emancipation
	ev <u>a</u> poration	imag <u>i</u> nation	inauguration
	inc <u>o</u> poration	interrog <u>a</u> tion	intoxication
	rev <u>o</u> lution	multiplic <u>a</u> tion	organization
	re <u>c</u> ommendation	represent <u>a</u> tion	
<u>-ly</u>	absolut <u>e</u> ly	accident <u>a</u> lly(P)	affection <u>a</u> lly
	approximat <u>e</u> ly	continual <u>l</u> y(P)	exception <u>a</u> lly(P)
	moderat <u>e</u> ly	industriou <u>s</u> ly	occasional <u>l</u> y(P)
	origin <u>a</u> lly	particul <u>a</u> rlly(P)	

<u>-ity</u>	curiosity	electricity	hospitality
	legibility	opportunity	personality
	popularity	probability	university
<u>-al</u>	agricultural	alphabetical	constitutional
	editorial	experimental	geographical
	international	oratorical	paradoxical
	periodical	transcontinental	
<u>un-</u>	uncomfortable (P)	unnecessary	unreasonable
	unsanitary		
<u>dis-</u>	disagreeable	disobedience	
other:	abolitionist	confectionary	inequality
	indivisible	revolutionize	

b. Other five-syllable words Frequency = 37

amphitheater	anniversary	appendicitis
archipelago	auditorium	cafeteria
cock-a-doodle-do	delicatessen	denominator
entymology	evaporated	exclamation
hippopotamus	hydroelectric	magically
inimitable	innumerable	inseparable
intermediate	interrogative	irreproachable
manufactory	metropolitan	miscellaneous
observatory	patriotism	Pennsylvania
preliminary	refrigerator	representative
sanatorium	superintendent (P)	theological
semicircular	zephyr	zodiac
zodiac		

2. Six-syllable words Frequency = 9

capitalization	characteristic	encyclopedia
extraor	oleomargarine	revolutionary
satisfactorily(P)	unconstitutional	unsatisfactory

b. Palatalizations Frequency = 137

Palatalizations, although relatively common, are rather complex (see Cronnell, 1969a, pp. 33-35). The three most frequent palatalizations--tion, ston, ture--are found in Section II (21,2; 21,3; 21,4; 25,1). The remaining palatalizations are listed below.

1. a. -cial → [ʃəl]:

artificial	beneficial	commercial	especially(P)
financial	judicial	official	social
special	specialist	specially(P)	specialty

b. -sure → [ʃʊr]:

exposure	leisure	measure	measurement
pleasure	treasure	treasurer	treasury

c. -ssure → [ʃʊr]:

assure (or [ʃʊr])	pressure
-------------------	----------

d. -tune → [ʃʊr] (or [ʃʊn]):

fortunate	fortunately	fortune	fortune-teller
misfortune	unfortunately		

2. a. -sia → [ʃʊa]:

Asia	Persia
------	--------

b. -sian → [ʃʊn]:

artesian

c. -ssian → [ʃʊn]:

Russian

d. -cian → [ʃʊn]:

electrician	magician	physician
politician		

- e. -cient · [ʃənt]: ancient effcient suffcient
suffciently
- f. -science · [ʃəns]: conscience
- g. -ciency · [ʃənsi]: effciency profciency
- h. -tient · [ʃənt]: impatient impatiently patient
patiently quotient
- i. -tience · [ʃəns]: patience
- j. -tia · [ʃə]: militia
- k. -tial · [ʃəl]: essential initial partial
residential
- l. -dial · [jəl]: cordial cordially
3. a. -tious · [ʃəs]: ambitious cautios cautiosly
nutritious superstitious
- b. -teous · [ʃəs]: righteos
- c. -gious · [jəs]: contagious religios
- d. -geous · [jəs]: advantageous courageous gorgeos
outrageous
- e. -cious · [ʃəs]: delicious ferocious gracios
precios spacios suspicious
vicios
- f. -scious · [ʃəs]: conscios unconscios
- g. -xious · [ʃəs]: anxios anxiosly

4. a. -ci- · [ʃi]: appreciate appreciation associate
 b. -ti- · [ʃi]: initiate
 c. -su- · [ʒu]: unusual unusually usual
 d. -tu- · [ʒu]: actual actually (P) congratulate
 congratulation eventually (P) mature
 punctual punctuality punctuation
 spiritual (P) statuary statue
 e. -tur(e) · [ʃər]: natural (P)
 naturally (P) saturate unnatural (P)
 f. -teur · [ʃər]: amateur pasteurization pasteurize
 g. -du- · [ju]
 (or [jə]): educate educated education
 educational gradual graduate
 graduation individual pendulum
 schedule situate situation
 5. a. -tian · [ʃən] Christian
 b. -xion · [kʃən]: complexion complexioned
 c. -cean · [ʃən]: Atlantic Ocean ocean Pacific Ocean
-ce · [ʃi]: oceanic
 d. -gion · [jən]: legion region religion
 e. -dier · [jər]: soldier
 f. -cier · [ʃər]: glacier
 g. -zier · [ʒər]: glazier
 h. -sier · [ʒər]: hosiery
 i. -ssue · [ʒu]: issue tissue
 j. -sur- · [ʒər]: insurance

- k. -xur- → [xʊer]. luxury
l. -cies → [ʃiz]. species
m. -tio → [ʃo]: ratio

Errata and Addenda

After this report was completed, some errors were discovered, which, however, should not substantially affect the usefulness of the materials. In addition, a number of words were inadvertently omitted; these should be checked by program developers to add words necessary for reading.

Words sequenced twice

The following words were sequenced twice; they are listed below, in sequence, with the position from which they should be deleted. In parentheses, is the position at which they do and should properly occur.

8,2	A16	accent	(20,4 CC11)
8,2	A16	object (N)	(10,1 E17)
10,1	E17	public	(ir 25,5 U14)
10,1	E17	publish	(ir 25,5 U14)
10,1	E17	midget	(14,1)
10,4	A16	accept	(20,4 CC11)
19,1	<u>-ance/-ant</u>	acceptance	(20,4 CC11)
27,6	A32	separate (A)	(ir 27,6 A32)
Section V, p4		natural	(ir, 21,4 <u>-ture</u>)

Words improperly included

The following words were mistakenly included, although not in the Berdiansky et al. (1969) lexicon. They should be deleted (unless desired by program developers).

17,3	<u>-er</u>	retainer
24,1	<u>-en</u>	undertaken
24,3	Y28	physics
ir 11,1	NG10	lengthen
ir 27,2	SP4	monogamy

additions

The following words were mistakenly omitted from the Berdiansky et al. (1969) lexicon. They should be added there and sequenced as follows.

coolie	26,2 IE17
freeway	12,1 AY10

irregularly spelled words, Section III of this volume.

Addenda

The following words were in the Berdiansky et al. (1967) lexicon, but were not sequenced. They should be placed in the sequence as follows.

2,1	SH10	shop		
5,1		big shot		
6,1	A11	scrape		
9,2	E21	ferment (N)		
10,1	E17	bidden		
10,2	Y17	angry		
10,4	E21	ferment (Vb)		
10,5	E17	extent		
11,3	WH10	big wheel		
12,1	AY10	today		
12,2	EA11	appear	beard	beaver
		speak		
	EA31	meant		
12,4	OW11	shallow		
13,3	024	throng		
14,1		fringe	hinge	lacrosse
		plunge	spond	
15,2		divine	export	golden
		import	instinct	sanful
		provoke	hortage	vista
16,1	A110	pigtail	rainbow	rainstorm
		trailer	training	
16,3	0A10	coat		
17,1		boll weevil	counterpane	pall bearer
17,2	-er	server		
	-s	pincers		
	-ed	doctored		
18,1	E13	beside	retailer	
	013	cocoa		
18,2	S10	muse		
18,4	025	barro	tho	
19,1	-ance /	rescendant	reliant	
	-ant			

20,1	-ful	unhealthful		
20,3	T112	brotherhood		
22,1	SP3B	phonograph		
22,2	SP3A	bacterin	compliment	copilot
		practical	popsicle	portable
22,3	SP3C	heroic	resemble	
22,4	SP3D	guarantee		
23,1	A24	washbasket		
23,2	I35	handicap		
24,1	compounds	self-reliance		
24,3	U28	depositor		
24,4		gravity	prosperity	
25,1		proposition		
25,2	U26	duofold		
	O26	oasis		
25,3	I36	guardian	median	radiator
25,5	A14	fragrant	patriot	
26,7	-ous	glorious		
	OU3T	tournament		
	OU35	fourteenth	mourning	
27,2	SP4A	affectionate	parenthesis	
27,6	E32	differently	temperature	

Irregularly-spelled words (Section III)

4,1	F10	nana	pa	
10,2	Y17	many		
12,2		beefsteak		
15,1		bye-bye		
15,2		forbade		
17,3	-ly	heartily		
18,1	L13	very		
	O13	modern	produce (N)	product
	I13	lily		
18,2	S20	basin	business	

19,1	-ment	improvement		
19,2	H2O	oh		
19,3	G20	champagne		
19,6	U20	plaque		
after 19,6		condemn	damn	
20,2	CH31	headache		
21,2		ambition	translation	
21,3		precision		
22,1	SP3B	monogram		
22,2	SP3A	vocative		
23,2	I25	frijoles		
23,3	Y15	rhythm		
	Y13	typhoid		
25,1		valuation		
25,5	I14	triple		
26,5	E110	serve		
27,3	SP4C	apparatus		
after 27,6		beau	exactly	exert
		yeoman		

Section V

A1	enthusiastic	manufacturer	
	necessarily		
A2	responsibility		
B1	unfortunate		
B4	gradually	pasteurizer	usually
B5	luxurious		

APPENDIX A

Key to Pronunciation and Symbols

Key to Pronunciation

The following phonetic symbols are used to indicate pronunciation. The symbols used in *International Phonetic Alphabet*, (1957) are given on the right for reference.

<u>Symbol</u>	<u>Key words (corresponding graphemes underlined)</u>	<u>Dictionary Symbol</u>
Vowels		
[i]	sc <u>e</u> ne, <u>n</u> eat, <u>s</u> ee, <u>ch</u> ief	<u>i</u>
[ɪ]	b <u>i</u> t, h <u>i</u> dden	<u>i</u>
[e]	<u>n</u> ame, <u>d</u> ay, <u>th</u> ey	<u>e</u>
[æ]	<u>g</u> et, <u>h</u> ead	<u>e</u>
[ʌ]	<u>f</u> at, <u>b</u> ad	<u>a</u>
[ɒ]	<u>h</u> ot, <u>c</u> ar	<u>o</u>
[ɔ]	<u>s</u> ong, <u>l</u> oss, <u>ta</u> ught, <u>l</u> awn, <u>t</u> alk, <u>b</u> all, <u>th</u> ought	<u>o</u>
[ɔː]	<u>b</u> one, <u>g</u> o, <u>f</u> ork, <u>t</u> oe, <u>b</u> oard, <u>k</u> now	<u>o</u>
[ʊ]	<u>put</u> , <u>push</u> , <u>book</u> , <u>could</u>	<u>oo</u>
[u]	<u>food</u> , <u>d</u> ew, <u>t</u> une	<u>oo</u>
[ʊ]	<u>but</u> , <u>a</u> b <u>ove</u>	(unstressed) <u>u</u> (stressed) <u>u</u>
[ɪ]	<u>c</u> ry, <u>m</u> ine, <u>d</u> ie	<u>i</u>
[ɔ]	<u>f</u> ound, <u>ow</u> l	<u>o</u>
[ɔɪ]	<u>bo</u> y, <u>no</u> ise	<u>oi</u>

<u>Symbol</u>	<u>Key words (corresponding graphemes underlined)</u>	<u>Dictionary Symbol</u>
Consonants		
[b]	<u>b</u> oy, ca <u>b</u>	
[ʃ]	<u>ch</u> urch, <u>ch</u> ip, ha <u>ch</u>	
[d]	<u>d</u> ead, <u>d</u> o	
[f]	<u>f</u> un, <u>f</u> air, <u>off</u>	
[g]	<u>g</u> o, <u>g</u> ay, <u>egg</u>	
[h]	<u>h</u> ome, <u>h</u> ead	
[ʒ]	<u>j</u> udge, <u>g</u> em, <u>a</u> ge	
[k]	<u>k</u> ill, <u>k</u> ick, <u>c</u> ome, <u>c</u> at	
[l]	<u>l</u> et, <u>l</u> ittle	
[m]	<u>m</u> an, ha <u>m</u>	
[n]	<u>n</u> o, ha <u>nd</u>	
[ŋ]	si <u>ng</u> , si <u>ng</u> le, thi <u>nk</u>	
[p]	<u>p</u> ull, tri <u>p</u>	
[r]	<u>r</u> ed, fa <u>r</u>	
[s]	<u>s</u> ee, <u>i</u> ce, mi <u>ss</u>	
[ʃ]	<u>s</u> he, <u>s</u> ure, <u>i</u> ss <u>ue</u> , na <u>ti</u> on, ha <u>sh</u>	
[t]	<u>t</u> en, hi <u>t</u> , li <u>k</u> ed	
[v]	<u>v</u> ase, lo <u>v</u> e	
[w]	<u>w</u> et, lan <u>gu</u> age, qu <u>ic</u> k	
[j]	<u>y</u> et, <u>y</u> ou	
[z]	<u>z</u> oo, la <u>z</u> y, ple <u>a</u> se, wi <u>v</u> es	
[ʒ]	vi <u>s</u> ion, treas <u>u</u> re	
[θ]	<u>th</u> ing, ba <u>th</u>	
[ð]	<u>th</u> em, ba <u>th</u> e	

Key to Symbols

Parts of speech

Aj = adjective

N = noun

Vb = verb

Other symbols

P = alternate pronunciation (e.g., for either, route)

AS = alternate stress pattern (e.g., for invalid), generally also involving an alternate pronunciation (P)

€ = a final silent e (Rule E18) which is dropped when adding a suffix (e.g., hide, hiding)

V = vowel

C = consonant

Ø = silent letter

Symbols used in stating rules of correspondence are described in Beldiansky, Cronnell, and Koehler (1969, pp. 14-15). Additionally, in the present report, the arrow (→) is sometimes used to represent a orthographic change e.g., y → i + ly (i.e., y becomes--is changed to--i when ly is added, e.g., happy, happily).

APPENDIX B

Glossary

AFFIX: a nonfree form added to a word to make a new word, e.g., the un- in unfair, the -s in boys. Affixes include both prefixes and suffixes.

BASE (WORD): a word to which an affix is added forming a new word; e.g., boy is the base in boys.

COMPOUND: a word composed of two (or more) words, e.g., goldfish, houseboat.

CONSONANT DIGRAPH: a grapheme unit composed of two or more consonant letters, e.g., th, ck, qu.

DOUBLE CONSONANT: a grapheme unit composed of two occurrences of the same consonant, e.g., dd, ll. Because of English phonotactics, most spelled double consonants are pronounced the same as a single consonant, e.g., d → [d], dd → [d]. Because of environmental constraints on c and g, this does not completely apply to cc and gg; nor does it apply to words containing morpheme boundaries, e.g., dd → [ɔd] in midday. The term "geminate" is sometimes used when describing double consonants.

ENVIRONMENT: other letters or sounds in a word which affect a spelling-to-sound correspondence. Indicated by a slash (/) and by underlining in the position of the correspondence. E.g., the environment / r means that the correspondence occurs when the grapheme unit is followed by r.

EXCEPTION: a grapheme unit in a word for which no (listed) spelling-to-sound correspondence is applicable. Words containing exceptions are also called exceptions. Since such exceptions were coded "40," the words are sometimes known as "40 words." The term "irregular" refers to exceptions.

EXEMPLAR: a word containing a particular spelling-to-sound correspondence.

GRAPHEME: a unit of an alphabet, a letter. For English, any of the 26 letters.

GRAPHEME UNIT: one or more letters (graphemes) functioning as a unit in deriving spelling-to-sound correspondences, e.g., a, t, mm, oy, th, qu. Whatever is on the left-hand side of a rule of correspondence is a grapheme unit.

IRREGULAR: see EXCEPTIONS.

MULTISYLLABLE: a word of two or more syllables.

PRIMARY VOWEL. a grapheme unit composed of a single vowel letter, i.e.,
a, e, i, o, u, y.

RULES OF CORRESPONDENCE: see SPELLING-TO-SOUND CORRESPONDENCE.

SECONDARY VOWEL. a grapheme unit composed of two (or more) vowel letters,
e.g., ee, oa, ay. Also called "vowel digraph."

SILENT LETTER. a letter in a word for which there is no corresponding
sound in the pronunciation of the word (symbolized by Ø). Some
silent letters mark the pronunciation of other letters, e.g., the
e in name; some are graphotactic devices, e.g., the e in have;
some are anachronisms or scribal inventions, e.g., the gh in
tough, the b in debt.

SPELLING-TO-SOUND CORRESPONDENCE: the relationship between the spelling
and pronunciation of a grapheme unit. Also called spelling-to-sound
correspondence rules and rules of correspondence (rules, for short).

STRESS. the degree of prominence found on a syllable. The basic
distinction in spelling-to-sound correspondences is between stressed
(marked ' over a vowel) and unstressed (unmarked) syllables. In
polysyllabic words it is useful to recognize two levels of stress:
primary (') and secondary (ˈ), e.g., accommodate. Stress is some-
times called accent.

SYLLABLE. a segment of speech containing one vowel sound and optional
consonant sounds. (In addition, certain consonant sounds may be
syllabic).

APPENDIX C

Summary of Rule Sequence

FIRST YEAR

Block 1

- 1,1 N10, NN10, T10, (TT10) , A15, I15
- 1,2 P10, (PP10)
- 1,3 L10, LL10, S10, SS10
- 1,4 D10, DD10, E15
- 1,5 M10, (MM10), B10, (BB10), U15
- 1,6 R10, (RR10), H10, O15

Block 2

- 2,1 SH10
- 2,2 TH13, TH11

Block 3

- 3,1 EE10, E25
- 3,2 Y19

Block 1 double consonant rules in parentheses have no exemplars at the point where they are listed in the sequence. Nevertheless, they are included--with their corresponding single consonant rules--because both rules have the same pronunciation. In Volume 1 (Section II and in Appendix C) it is noted where exemplars of the parenthesized rules first appear.

Block 4

4,1	F10, FF10, W10
4,2	K10, N20, C12, CK10
4,3	G12
4,4	J10, X10, Y10
4,5	V10, Z10, ZZ10

SECOND YEAR

Block 5

- 5,1 Compounds using first year rules (first syllable stressed)
- 5,2 -ing suffix with previously introduced base words
- 5,3 -es suffix (plurals and third-person singular, present tense forms) of previously introduced base words
- 5,4 -ed suffix (past tense) of previously introduced base words
- 5,5 NG10 (one-syllable words)

Block 6

- 6,1 E18, A11, 111
- 6,2 011, U11, E11, EE10 + E18

Block 7

- 7,1 C11, G11
- 7,2 -s, -d, and -ing suffixes; added to words with general primary vowel Rule 11.

Block 8

- 8,1 Compounds with rules in Blocks 5-7
- 8,2 A16, 116, U16, E16, 016 (two-syllable words, first syllable stressed)

Block 9

- 9,1 A21, 021, U21, 121, E21 (one-syllable words)
- 9,2 E21 (plus -er suffix with previously introduced words), U21, 121, A21, 021 (two-syllable words, first syllable stressed)
- 9,3 A25, 022

Block 10

- 10,1 117, U17, E17, A17, O17 (first syllable stressed)
- 10,2 Y17, LE22
- 10,3 Compounds (second syllable stressed)
- 10,4 416, U16, A16, O16, E21, O21, EE10 (two-syllable words, second syllable stressed)
- 10,5 A17, E17, O17, U17, 117 (second syllable stressed)

Block 11

- 11,1 NG10 (two syllables)
- 11,2 CH10, TCH10
- 11,3 WH10
- 11,4 QU10
- 11,5 GG10, CC12
- 11,6 G31

Block 12

- 12,1 AY10
- 12,2 EA11, EA31
- 12,3 OO11, OO12
- 12,4 OW11, OW12

Block 13

- 13,1 O31, U31
- 13,2 A23, O23
- 13,3 122, O24

Block 14

- 14,1 Stressed $V_{CCe\#}$
- 14,2 Stressed V_{rCe}
- 14,3 Unstressed $V_{CCe\#}$ and $V_{Ce\#}$

THIRD YEAR

Block 15

- 15,1 8-9 one-syllable word with first-year rules
- 15,2 8-9 words with second-year rules

Block 16

- 16,1 AI10
- 16,2 OU10
- 16,3 OE10, OA10
- 16,4 AW10, AU10
- 16,5 OI10, OY10
- 16,6 UE10, UI10, EW10

Block 17

- 17,1 Three-syllable compounds
- 17,2 Two-syllable words with suffixes: -er, -en, -ing, -y, -s, -ed
- 17,3 Three-syllable words with suffixes: -er, -en, -ing, -ed, -ly

Block 18

- 18,1 E13, O13, A13, I13, U13
- 18,2 S20, S21
- 18,3 A22
- 18,4 O25

Block 19

- 19,1 Three-syllable words with suffixes: -ment, -or, -ive,
-ness, -ance, -ant
- 19,2 IE11, 124 + GH10, GH10, H20
- 19,3 K20, G20, W20
- 19,4 B20
- 19,5 L20, T20
- 19,6 U20

Block 20

- 20,1 Three-syllable words with suffixes: -v, -ful, -al, -able,
-eth, -less, -ist, -ish
- 20,2 PH10, CH31
- 20,3 TH12
- 20,4 CC11

Block 21

- 21,1 Three-syllable words with prefixes: un-, re-, dis-, in-,
mis-
- 21,2 -tion
- 21,3 -sion
- 21,4 -ture

Block 22

- 22,1 Stress pattern 3B
- 22,2 Stress pattern 3A
- 22,3 Stress pattern 3C
- 22,4 Stress pattern 3D

FOURTH YEAR

Block 23

- 23,1 A29, A24
- 23,2 I35, I25
- 23,3 Y11, Y13, Y15, Y16

Block 24

- 24,1 Four-syllable compounds
Four-syllable words with suffixes: -ing, -y, -er, -or, -en, -ed, -ly
- 24,2 E38, I38, A38, O38
- 24,3 A28, I28, Y28, O28, E28
- 24,4 General primary vowel Rule 27

Block 25

- 25,1 Four-syllable words with -tion
- 25,2 I26, Y26, U26, E26, O26, A26
- 25,3 I36, Y36
- 25,4 A12, I12, Y12, O12, U12
- 25,5 E14, I14, Y14, A14, O14, U14

Block 26

- 26,1 Four-syllable words with suffixes: -able, -ment, -al, -ness,
-ary, -ist
- 26,2 IE17, EY17
- 26,3 A117
- 26,4 EA33
- 26,5 IE12, E110
- 26,6 EY10, E120
- 26,7 -ous, OU31, OU35, OU33, OU34
- 26,8 U131

Block 27

- 27,1 Four-syllable words with prefixes: un-, in-, dis-, mis-
- 27,2 Stress patterns 4A and 4B
- 27,3 Stress pattern 4C
- 27,4 Stress pattern 4D
- 27,5 Other four-syllable words (miscellaneous stress patterns)
- 27,6 E32, O32, A32, I32

APPENDIX D

Spelling-to-Sound Correspondences: Rule Description, Exemplars, Position in Sequence

Spelling-to-sound correspondences for primary vowels

<u>Grapheme Unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
A	11	$a \rightarrow [e] / _ Ce _$	<u>n</u> ame, br <u>a</u> ve	6,1
	12	$a \rightarrow [e] / _ C t^r e _$	<u>a</u> cre, st <u>a</u> ble	25,4
	13	$a \rightarrow [e] / _ CV$	b <u>a</u> by, n <u>a</u> ture	18,1
	14	$a \rightarrow [e] / _ C t^r V$	<u>A</u> pril, fr <u>a</u> grant	25,5
	15	$a \rightarrow [æ] / _ C(C) \#$	s <u>a</u> t, f <u>a</u> st	1,1
	16	$a \rightarrow [æ] / _ CC \dots$	s <u>a</u> ddle, j <u>a</u> cket	8,2
	17	$a \rightarrow [ə], [ɪ] \text{ in unstressed syllables}$	<u>a</u> bove, fin <u>a</u> l	10,1
	21	$a \rightarrow [ɑ] / _ r^C \#$	c <u>a</u> rt, c <u>a</u> r	9,1
	22	$a \rightarrow [ɪ], [æ] / _ r$	v <u>a</u> ry, m <u>a</u> rry	18,3
	23	$a \rightarrow [ɪ] / _ \left\{ \begin{array}{l} ll \\ lk \\ lt \\ ld \end{array} \right\}$	b <u>a</u> ll, w <u>a</u> lk, s <u>a</u> lt, b <u>a</u> ld	13,2
	24	$a \rightarrow [ɑ], [ɪ] / _ u^w _$	w <u>a</u> d, s <u>a</u> quat	23,1
	25	$a \rightarrow [ɔ] / _ \left\{ \begin{array}{l} wh \\ w \\ qu \end{array} \right\} _ r$	wh <u>a</u> rf, w <u>a</u> r, qu <u>a</u> rt	9,3

For further description of these rules and of the rule notation, see Berdiansky, Cronnell and Koehler (1969), Cronnell (1971), and Section III of this report. Asterisked rules do not appear in the earlier reports.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
A	26	a → [eɪ] / __ -V	mosa <u>i</u> c	25,2
	27	a → [i:] / __ C ity	human <u>i</u> ty, capac <u>i</u> ty	24,4
	28	a → [ɪ] / __ C { ic id ish it	mag <u>i</u> c, rap <u>i</u> d, rad <u>i</u> sh, hab <u>i</u> t	24,3
	29	a → [eɪ] / __ :nge ste#	strang <u>e</u> , past <u>e</u>	23,1
	32	a → Ø	separ <u>a</u> te	27,6
	38	a → [æ] / __ 'x(1)V ^{vV}	cav <u>a</u> rn, ax <u>i</u> s, ax <u>a</u> le	24,2
E	11	e → [i:] / __ Ce#	scen <u>e</u> , her <u>e</u>	6,2
	13	e → [i:] / __ CV	her <u>e</u> , met <u>e</u> r	18,1
	14	e → [i:] / __ C ^r V	zeb <u>e</u> ra, decl <u>e</u> re	25,5
	15	e → [i:] / __ C(C)·	set <u>e</u> , felt <u>e</u>	1,4
	16	e → [i:] / __ CC....	edg <u>e</u> , extr <u>a</u>	8,2
	17	e → [ɪ], [ɪ] in unstressed syllables	hidd <u>e</u> n, tal <u>e</u> nt, magn <u>e</u> t	10,1
	18	e → Ø / __	nam <u>e</u> , edg <u>e</u> , immens <u>e</u> , mic <u>e</u>	6,1
	19	e → Ø / __ ^s d	arm <u>e</u> d, wiv <u>e</u> s	---
	21	e → [ɪ] / __ rC ^r	her <u>d</u> , fath <u>e</u> r	9,1
	25	e → [i:] / : (C)C__	w <u>e</u> , sh <u>e</u>	3,1
	26	e → [i:] / __ -V	creat <u>e</u> , me <u>e</u> ow	25,2
	27	e → [i:] / __ C ity	prosper <u>i</u> ty	24,4

Not taught explicitly as a correspondence rule.

<u>Grapheme</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
E	23	$c \rightarrow _ / _ C \left\{ \begin{matrix} rC \\ rC \\ rC \end{matrix} \right\}$	re <u>l</u> ic, che <u>r</u> ish cre <u>d</u> it	24,3
	24	$c \rightarrow _ / _ V$	differe <u>n</u> ce, severa <u>l</u>	25,6
	25	$c \rightarrow _ / _ \begin{matrix} V \\ x(1)V \end{matrix}$	cleve <u>r</u> , ex <u>i</u> t	25,2
I	11	$c \rightarrow _ / _ Ce$	ti <u>n</u> e, li <u>k</u> e	6,1
	12	$c \rightarrow _ / _ C \left\{ \begin{matrix} r \\ r \end{matrix} \right\} e$	ti <u>t</u> le, i <u>d</u> le	25,4
	13	$c \rightarrow _ / _ CV$	pi <u>l</u> ot, ci <u>d</u> er	18,1
	14	$c \rightarrow _ / _ C \left\{ \begin{matrix} r \\ r \end{matrix} \right\}$	mi <u>g</u> rate, i <u>d</u> ly	25,5
	15	$c \rightarrow _ / _ C(C)~$	si <u>t</u> , mi <u>l</u> k	1,1
	16	$c \rightarrow _ / _ CC....$	hi <u>dd</u> en, li <u>tt</u> le	8,2
	17	$c \rightarrow _ / _ \text{in unstressedsyllables}$	mi <u>ss</u> ile, offi <u>c</u> e	12,1
	21	$c \rightarrow _ / _ \begin{matrix} rC \\ rC \end{matrix}$	bi <u>r</u> d, si <u>r</u>	3,1
		$c \rightarrow _ / _ \left\{ \begin{matrix} nd \\ ld \\ gn \end{matrix} \right\}$	ti <u>nd</u> , i <u>ld</u> , si <u>gn</u>	13,3
	24	$c \rightarrow _ / _ gh$	hi <u>gh</u> , ri <u>gh</u> t	19,2
	25	$c \rightarrow _ / _ VC$	mi <u>ll</u> ion, on <u>i</u> on	23,2
		$c \rightarrow _ / _ -V$	li <u>a</u> r, di <u>e</u> t	25,2
3	27	$c \rightarrow _ / _ \text{cont.}$	hu <u>m</u> ility, cap <u>t</u> ivity	24,4
		$c \rightarrow _ / _ \left\{ \begin{matrix} rC \\ rC \\ rC \end{matrix} \right\}$	cl <u>i</u> me, ti <u>m</u> e, fi <u>n</u> ish, li <u>gh</u> t	24,3

<u>Grapheme Unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
I	32	$i \rightarrow \emptyset$	aspir <u>i</u> n	27,6
	35	$i \rightarrow$	pol <u>i</u> ce, ski <u>i</u>	23,2
	36	$i \rightarrow$ /___ -V	radio, peri <u>o</u> d	25,3
	38	$i \rightarrow$ /___ $\begin{smallmatrix} \text{VV} \\ \text{x(1)V} \end{smallmatrix}$	civ <u>i</u> c, riv <u>e</u> r	24,2
O	11	$o \rightarrow$ /___ Ce	h <u>o</u> ne, snak <u>e</u>	6,2
	12	$o \rightarrow$ /___ C $\begin{smallmatrix} \text{r} \\ \text{e} \end{smallmatrix}$	ag <u>re</u> , nob <u>le</u>	25,4
	13	$o \rightarrow$ /___ CV	not <u>i</u> ce, od <u>o</u> r	18,1
	14	$o \rightarrow$ /___ C $\begin{smallmatrix} \text{r} \\ \text{v} \end{smallmatrix}$	ok <u>ra</u> , on <u>ly</u>	25,5
	15	$o \rightarrow$ /___ C(C)	lot, lock	1,6
	16	$o \rightarrow$ /___ CC....	not <u>to</u> , hock <u>e</u> y	8,2
	17	$o \rightarrow$, ... in unstressed syllables	lot <u>to</u> n, sail <u>o</u> r	10,1
	21	$o \rightarrow$, ... /___ t	h <u>o</u> rn, tort <u>o</u> ise	9,1
	22	$o \rightarrow$ /w___ rt	w <u>o</u> rd, w <u>o</u> rth	9,3
	23	$o \rightarrow$ /___ t	roll, s <u>o</u> ld, v <u>o</u> lk, b <u>o</u> lt	13,2
	24	$o \rightarrow$, ... /___ $\begin{pmatrix} \text{ng} \\ \text{ss} \\ \text{t} \\ \text{th} \\ \text{q} \end{pmatrix}$	cl <u>o</u> ff, lat <u>o</u> ter, s <u>o</u> ng, m <u>o</u> ss, lost, b <u>o</u> th, dog	13,3
	25	$o \rightarrow$ /___	go <u>o</u> d, not <u>o</u>	18,4
	26	$o \rightarrow$ /___ -v	po <u>o</u> r	25,2
	27	$o \rightarrow$ /___ C $\begin{pmatrix} \text{r} \\ \text{d} \\ \text{sh} \\ \text{t} \end{pmatrix}$	ph <u>o</u> ne, ch <u>o</u> ld, ph <u>o</u> ne, ph <u>o</u> ne	24,3

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
Y	16	y → [ɪ] / __CC...	sys <u>tem</u> , gyps <u>y</u>	23,3
	17	y → [ɪ], [ɪ] / __# in unstressed syllables	bab <u>y</u> , cand <u>y</u>	10,2
	19	y → [aɪ] / __# in stressed syllables	den <u>y</u> , tr <u>y</u>	3,2
	26 ^A	y → [aɪ] / __-V	hy <u>ena</u>	25,2
	28 ⁱ	y → [ɪ] / __C { ic id ish it	phys <u>i</u> c	24,3
	36	y → [ɪ] / __-V	Tok <u>y</u> o	25,3

Spelling-to-sound correspondences for secondary vowels¹

AI	10	ai → [e]	st <u>ai</u> n, r <u>ai</u> n	16,1
	17	ai → [ʊ], [ɪ] in unstressed syllables	capt <u>ai</u> n, vill <u>ai</u> n	20,3
AU	10	au → [ʊ]	ca <u>u</u> se, auth <u>or</u>	16,4
AW	10	aw → [ʊ]	s <u>aw</u> , h <u>aw</u> k	16,4
AY	10	ay → [e]	d <u>ay</u> , pl <u>ay</u>	12,1
EA	11	ea → [ɪ]	<u>ea</u> ch, h <u>ea</u> t	12,2
	31	ea → [ɪ]	br <u>ea</u> d, de <u>a</u> f, h <u>ea</u> ven	12,2
	33	ea → [ʊ] / __r	<u>ea</u> rn, s <u>ea</u> rch	26,4
EE	10	ee → [i]	b <u>ee</u> t, f <u>ee</u> l	3,1
EI	10	ei → [i]	re <u>cei</u> ve, c <u>ei</u> ling	26,5
	20	ei → [ɪ] / __ { gn n gh	re <u>i</u> gn, re <u>i</u> n, n <u>ei</u> ghbor	26,6

<u>Grapheme Unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
EW	10	ew → [i:] / ____	<u>few</u> , <u>new</u>	16,6
EY	10	ey → [e:] / ____	<u>they</u> , <u>obey</u>	26,6
	17	ey → [ɪ] in unstressed syllables	<u>donkey</u> , <u>money</u>	26,2
IE	11	ie → [a:] / ____	<u>die</u> , <u>lie</u>	19,2
	12	ie → [i:] / ____	<u>field</u> , <u>grief</u>	26,5
	17	ie → [ɪ] / ____ in unstressed syllables	<u>collie</u> , <u>movie</u>	26,2
OA	10	oa → [o:]	<u>load</u> , <u>boat</u>	16,3
OE	10	oe → [o:] / ____	<u>hoe</u> , <u>toe</u>	16,3
OI	10	oi → [ɔ:]	<u>noise</u> , <u>join</u>	16,5
OO	11	oo → [u:]	<u>broom</u> , <u>tool</u>	12,3
	12	oo → [ʊ]	<u>book</u> , <u>wood</u>	12,3
OU	10	ou → [a:]	<u>count</u> , <u>mountain</u>	16,2
	31	ou → [ʊ]	<u>couple</u> , <u>young</u>	26,7
	33	ou → [ɪ (y)] / ____	<u>through</u> , <u>group</u>	26,7
	34	ou → [ɔ:]	<u>fought</u> , <u>thought</u>	26,7
	35	ou → [u]	<u>soul</u> , <u>though</u>	26,7
OW	11	ow → [ɔ:]	<u>glow</u> , <u>below</u> , <u>own</u> , <u>bow</u>	12,4
	12	ow → [a:]	<u>now</u> , <u>allow</u> , <u>owl</u> , <u>bow</u>	12,4
OY	10	oy → [ɔ:]	<u>boy</u> , <u>toy</u>	16,5
UE	10	ue → [i (y)] / ____	<u>blue</u> , <u>argue</u>	16,5
UI	11	ui → [i (y)] / ____	<u>fruit</u> , <u>juice</u>	16,6
UB	31	ui → [ɪ]	<u>build</u> , <u>broadcast</u>	26,7

Spelling-to-sound correspondences for consonants

<u>Grapheme unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
B	10	b → [b]	<u>b</u> oy, cu <u>b</u> , num <u>b</u> er	1,5
	20	b → Ø /m <u> </u>	clim <u>b</u> , comb <u> </u>	19,4
BB	10	bb → [b]	bu <u>bb</u> le, blu <u>bb</u> er	1,5 (9,2)
C	11	c → [s] / <u> </u> ^e _i y	<u>c</u> ity, lac <u>e</u> , fan <u>c</u> y	7,1
	12	c → [tʃ] / <u> </u> ^a o u c #	<u>c</u> at, <u>c</u> ome, <u>c</u> ut <u>c</u> ream, pic <u>n</u> ic, sc <u>a</u> re	4,2
CC	11	cc → [ns] / <u> </u> ^e i y	acc <u>ent</u> , succ <u>eed</u>	20,4
	12	cc → [tʃ] / <u> </u> ^a u	yucc <u>a</u> , acc <u>ount</u> , acc <u>use</u>	11,5
CH	10	ch → [tʃ]	<u>ch</u> ea <u>p</u> , <u>ch</u> ur <u>ch</u>	11,2
	31	ch → [r]	ac <u>h</u> e, sc <u>h</u> ool, ch <u>o</u> rd, <u>Ch</u> rist	20,2
CK	10	ck → [k]	ki <u>ck</u> , pa <u>ck</u>	4,2
D	10	d → [d]	<u>d</u> ea <u>d</u> , nee <u>d</u> le	1,4
DD	10	dd → [d]	hi <u>dd</u> en, su <u>dd</u> en	1,4
F	10	f → [f]	<u>f</u> a <u>t</u> , a <u>f</u> ter	4,1
FF	10	ff → [f]	o <u>ff</u> , ta <u>ff</u> y	4,1

The unit in parentheses after some double consonant rules indicates the first actual occurrence.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
G	11	$g \rightarrow [j] / \begin{smallmatrix} e \\ i \\ y \end{smallmatrix}$	<u>g</u> em, a <u>g</u> e, <u>g</u> in, <u>g</u> ypsy	7,1
	12	$g \rightarrow [g] / \begin{Bmatrix} a \\ o \\ u \\ C \\ \# \end{Bmatrix}$	<u>g</u> ave, <u>g</u> o, <u>g</u> um, <u>g</u> reen, ba <u>g</u>	4,3
	20	$g \rightarrow \emptyset / \begin{Bmatrix} \# _ n \\ _ n \# \end{Bmatrix}$	<u>g</u> naw, si <u>g</u> n	19,3
	31	$g \rightarrow [g]$	<u>g</u> et, <u>g</u> irl	11,6
GG	10	$gg \rightarrow [g]$	e <u>gg</u> , wi <u>gg</u> le	11,5
GH	10	$gh \rightarrow \emptyset$	th <u>ough</u> , ta <u>ugh</u> t, hi <u>gh</u>	19,2
H	10	$h \rightarrow [h]$	<u>h</u> ome, a <u>h</u> ead	1,6
	20	$h \rightarrow \emptyset$	<u>r</u> aj <u>ah</u> , <u>h</u> our	19,2
J	10	$j \rightarrow [j]$	<u>j</u> oy, <u>j</u> udge	4,4
K	10	$k \rightarrow [k]$	mi <u>lk</u> , <u>k</u> ill	4,1
	20	$k \rightarrow \emptyset / \# _ n$	<u>k</u> now, <u>k</u> not	19,3
L	10	$l \rightarrow [l]$	<u>l</u> ike, mi <u>l</u> e	1,3
	20	$l \rightarrow \emptyset / \begin{Bmatrix} o _ k \\ a _ f \\ a _ k \\ a _ m \\ a _ v \end{Bmatrix}$	yo <u>lk</u> , fo <u>lk</u> , ha <u>lf</u> , ca <u>lf</u> , wa <u>lk</u> , sta <u>lk</u> , pa <u>lm</u> , ca <u>lm</u> , ca <u>lv</u> es, sa <u>lv</u> e	19,5
LE	22	$le \rightarrow [al] / C _ \#$	li <u>ttle</u> , sta <u>ble</u>	10,2
LL	10	$ll \rightarrow [l]$	bu <u>llet</u> , fi <u>ll</u>	1,3
M	10	$m \rightarrow [m]$	<u>m</u> an, ca <u>m</u> e	1,5
MM	10	$mm \rightarrow [m]$	su <u>mm</u> er, ma <u>mm</u> al	1,5 (9,2)
N	10	$n \rightarrow [n]$	<u>n</u> o, <u>n</u> ine, fu <u>n</u>	1,1

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
N	20	$n \rightarrow [ŋ] / \begin{cases} x \\ k \\ qu \\ y \text{ pronounced } [g] \\ c \text{ pronounced } [k] \end{cases}$	an <u>x</u> ious, th <u>an</u> k, sin <u>k</u> , ban <u>qu</u> et, sin <u>g</u> le, fun <u>g</u> us, fin <u>g</u> er, Lin <u>co</u> ln	4,1
NG	10	$ng \rightarrow [ŋ] / _$	ri <u>ng</u> , son <u>g</u>	5,5
NN	10	$nn \rightarrow [n]$	in <u>nn</u> er, fun <u>nn</u> y	1,1
P	10	$p \rightarrow [p]$	pe <u>p</u> le, po <u>p</u>	1,2
PP	10	$pp \rightarrow [p]$	pepp <u>er</u> , app <u>le</u>	1,2 (9,2)
PH	10	$ph \rightarrow [f]$	ph <u>o</u> ne, ph <u>o</u> to	20,2
QU	10	$qu \rightarrow [kw]$	qu <u>i</u> ck, banqu <u>e</u> t	11,4
R	10	$r \rightarrow [r]$	ru <u>n</u> , far <u> </u>	1,6
RR	10	$rr \rightarrow [r]$	hur <u>rr</u> y, marri <u>rr</u> age	1,6 (9,1)
S	10	$s \rightarrow [s]$	su <u>n</u> , fa <u>st</u> , hor <u>s</u> e	1,3
	20	$s \rightarrow [z] / V _ V$	no <u>s</u> e, ea <u>s</u> y	18,2
	21	$s \rightarrow [s] / \begin{cases} ou \\ oo \\ ea \\ a \end{cases} _ e$	hou <u>s</u> e, moo <u>s</u> e, lea <u>s</u> e, ca <u>s</u> e	18,2
	31	$s \rightarrow [z] / _ \#$	trou <u>s</u> ers, wiv <u>s</u> , rich <u>s</u>	---
SH	10	$sh \rightarrow [ʃ]$	sh <u>o</u> e, ru <u>sh</u>	2,1
SS	10	$ss \rightarrow [s]$	me <u>ss</u> , mi <u>ss</u> le	1,3

Not explicitly taught as a correspondence rule.

<u>Grapheme unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
t	10	$t \rightarrow [t]$	<u>ti</u> tle, le <u>t</u>	2,1
	20	$t \rightarrow \emptyset / \begin{cases} s_le\# \\ s_en\# \\ f_en \end{cases}$	w re <u>s</u> tle, fa <u>s</u> ten, 19,5 o <u>f</u> ten	
tch	10	$tch \rightarrow [tʃ]$	<u>ma</u> tch, <u>no</u> tch	11,2
th	11	$th \rightarrow [θ]$	<u>th</u> in, ba <u>th</u>	2,2
	12	$th \rightarrow [ð] / \begin{cases} e \\ er \\ ern \end{cases}$	ba <u>th</u> e, fa <u>th</u> er, 20,3 no <u>th</u> ern	
	13	$th \rightarrow [ð]$ in pronouns, conjunctions, and function words.	<u>th</u> ey, al <u>th</u> ough, 2,1 <u>th</u> e	
tt	10	$tt \rightarrow [t]$	l <u>itt</u> le, mi <u>tt</u>	1,1 (9,2)
v	10	$v \rightarrow [v]$	<u>v</u> ase, lo <u>v</u> e	4,5
w	10	$w \rightarrow [w]$	<u>w</u> et, be <u>w</u> are	4,1
	20	$w \rightarrow \emptyset / \begin{cases} r \\ er \end{cases}$	<u>w</u> ren, <u>w</u> rong	19,3
wh	10	$wh \rightarrow [tʰw]$ or $[w]$	<u>wh</u> en, <u>wh</u> ether	11,2
x	10	$x \rightarrow [ks]$	bo <u>x</u> , o <u>x</u> en	4,4
y	10	$y \rightarrow [j]$	<u>y</u> et, be <u>y</u> ond	4,4
z	10	$z \rightarrow [z]$	<u>z</u> oo, la <u>z</u> y	4,5
zz	10	$zz \rightarrow [z]$	bu <u>zz</u> , fu <u>zz</u> y	4,5 (10,1)

APPENDIX E

Number of Words Sequenced for Reading Instruction

Year	Basic word list (Section II)	Irregularly- spelled words (Section III)	Proper names (Section IV)	Irregularly- spelled proper names (Section IV)	Total
1	796	35	65	---	896
2	2286	110	159	---	2568
3	3210	615	95	37	3960
4	1130	384	103	28	1644
Total	7422	1142	422	65	9066
Additional unsequenced material (Section V)					248
Grand total					9311

Total number of names: 487

Total number of other words: 8824

(This is approximately 1% less than the total number of words in the lexicon as reported in Berdiansky, Cronnell, and Koehler, 1969. This small difference may be due to (1) human error in compiling lists and frequencies, and (2) correction of errors in the lexicon. A number of additions are found in the Errata and Addenda of the present volume.)

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DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM

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ABSTRACT

From a 9000-word lexicon, a set of spelling-to-sound correspondence rules was developed to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence.

This report is in two volumes: Volume I describes sequencing criteria and methodology, and the specific rule sequence; Volume II lists all words (including irregularly-spelled words and proper names), sequenced by and within rules.

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Introduction

The Model 2 Communication Skills Program of the Southwest Regional Laboratory for Educational Research and Development includes a phonics-based reading program founded on a set of spelling-to-sound correspondence rules. The decision to use correspondence rules in teaching the skill of decoding printed words was based principally on the fact that spelling-sound patterns of English words are generally regular and specifiable by means of a manageable number of rules (Venezky, 1967, 1970). Since the regularities of English spelling-to-sound patterns far outnumber the irregularities, a rule-based phonics approach is more likely to provide positively transferable elements in decoding new words than a nonphonics approach, and the few irregularities can be learned as sight words. For a detailed discussion of the merits of a phonics approach, and the use of rules of correspondence in such a reading program, see Desberg and Berdiansky (1968) and Berdiansky, Cronnell, and Koehler (1969).

Identification of the Lexicon

The first step in the design of this reading program was the specification of a lexicon appropriate for children at the kindergarten through third-grade level. Twenty-nine different sources were consulted in this regard, including the Rinsland (1945) list for elementary school children, published preprimer to fourth grade reading materials, published word lists, children's responses to word association tasks, children's TV programs, children's verbal behavior in song and in play, and special interest materials (e.g., clock time information). Approximately 9500

Words were selected and categorized as appropriate for the 6-7 age group, if not earlier, when a child is able to read. This provides an adequate base for studying the self-instruction-card correspondence needed at beginning reading, as well as an ample supply of words for actual use in the reading program. Words not already categorized by the Finlander list were screened and categorized by the SWPL staff, and categorized as appropriate to enter the 6-7 or 8-9 year-old age group (equivalent to r-1 and 2-3 grade levels, respectively).

development of pebble size and correspondence, rule,

After specification of the lexicon, the spelling-to-orthographic correspondence rules were developed--based primarily on the work of Venezky (1967, 1970). Venezky's rules were modified somewhat to enable the reader to produce a transcription of a graphemic to a phonemic representation of the spelling--that is, orthographically to graphically. Moreover, the orthographic-to-phonemic correspondence was limited to the 600 orthographically available words in the CWEB lexicon, and there were some adjustments made to the orthographic-to-phonemic rules to account for the orthographic-to-phonemic correspondence.

The graph in Figure 26 better illustrates a total ordering on the elements of \mathcal{L}_n and the relation \leq for the lexicon. The elements of \mathcal{L}_n are ordered from top to bottom, and every element is greater than or equal to all elements below it.

1. The first group of respondents (n = 10) was asked to identify the most important factors influencing their decision to use a mobile app. The results showed that the most important factors were ease of use, usefulness, and security.

The following table shows the number of persons who have been
 convicted of the crime of murder in the State of New York,
 from 1880 to 1890, inclusive, and the number of persons who
 have been executed for the same crime, during the same period.
 The number of persons who have been convicted of the crime of
 murder, and the number of persons who have been executed for
 the same crime, are given for each year, and for the whole
 period. The number of persons who have been convicted of the
 crime of murder, and the number of persons who have been
 executed for the same crime, are given for each year, and for
 the whole period.

2. consonant digraphs, e.g., two consonant letters, the pronunciation of which can be inferred from the correspondences for the individual letters, e.g., ch, th,
3. strings of letters which commonly function together as units, e.g., ck, le,
4. secondary vowel, i.e., two or more vowel letters with a single corresponding pronunciation, e.g., au, ea.

A total of 166 correspondences were established for the one- and two-letter words in the lexicon. (A list of all correspondences, with examples, is found in Appendix C. See Berdiansky et al., 1969, Section III, and Berdiansky, 1971, for a complete description of the correspondences for this project.) However, for nearly two-thirds (42) of the 69 grapheme units, one correspondence rule was sufficient, for 15 of the grapheme units, two rules were needed, for the remainder, 7 grapheme units, three or more rules were needed. It was the primary vowels (a, e, i, o, u, y), with 14-16 correspondence rules apiece, that appreciably raised the total number of rules established for the lexicon. This latter number is not very surprising considering the well-known variability of English vowel spellings.

The large number of correspondences may imply an unwarranted degree of complexity. The following four points should clarify this issue.

1. Many correspondences are generalizable across several grapheme units. For example, correspondences for final VCe), this is particularly true for primary vowels where there are ten such cases, i.e., ten separate grapheme-letter correspondence rules which can be reduced to ten general vowel correspondences (referred to

as "general primary vowel rules").

2. Correspondences which were general but complex (e.g., $\underline{u} \rightarrow \underline{u}$, $\underline{r} / \underline{C} (\begin{smallmatrix} r \\ l \end{smallmatrix}) V$) were broken down into several simpler ones (e.g., Rules 011, 012, 013, 014). This simplification, while reducing complexity, did increase the number of correspondences.
3. correspondences were established for each double consonant, although, in all instances but two, pronunciation is the same as for the single consonant.
4. While the environmental conditions differ for each correspondence for a particular grapheme unit, the number of different pronunciations involved is relatively small. After allowing for one to six single-word pronunciation irregularities per grapheme unit, 35 of the grapheme units have just one pronunciation and 17 have just two (See Appendix n).

Thus, the larger number of correspondences does not necessarily indicate a proportionately greater amount of learning difficulty.

With the list of correspondences appropriate to the lexicon established, the 1000 most accessible words are coded for their component correspondences. (a cell = a) for other information such as frequency, etc. Each word is then processed by computer and group of correspondences for each word appeared in the list of exemplars. The list of its component correspondences (e.g., the word in, coded 115,4,9), is included in the printout both for Rule 115 and N10). Using the

¹ For example, in the numbering system used for the rules, the word in is coded 115,4,9. In the database, in is coded 115,4,9.

computer-generated data, counts were made of the frequency of individual correspondences (e.g., the frequency of 115 = 502 which means that Rule 115 occurs in 502 words). These frequency counts provided information on the usefulness of correspondences and were employed in the sequencing of correspondences.

Statement of Task

In order to use spelling-to-sound correspondences in an instructional program, they must first be sequenced. Therefore, after the compilation of the lexicon and the specification of the spelling-to-sound correspondence rules, the subsequent task in the development of the reading program was the formulation of an instructionally efficient and practical rule sequence.

The major criteria for the fulfillment of this task were as follows:

1. The spelling-to-sound correspondence rules were to be sequenced primarily according to frequency of occurrence in the SWRL lexicon. High-frequency correspondences are more useful because they provide more word exemplars and greater opportunity for transfer.
2. The sequence of reading instruction was to begin with simple regular rules. Complex rules and rules with pronunciation variations were to be introduced later. More specifically:
 - a. correspondences for single letters would precede correspondences for grapheme units of two or more letters,
 - b. grapheme units with only one correspondence would precede those with two or more

- c. correspondences with no environmental constraint would precede those with environmental constraints;
 - d. geminate consonant rules (e.g., #M10) could be sequenced with their corresponding single consonant rules (e.g., #M1).
3. Rules were placed earlier in the sequence if they occurred in words which individually had high speech frequencies. Thus, when combined with rules having high, total lexicon frequencies, a small number of rules would be able to generate a large number of frequently-used words.
4. The rules were to be sequenced so that, from the beginning of the program, syntax approximating that of normal speech would be possible by using primarily those words containing the primary target. The number of syllable words necessary for the natural syntax was to be minimal.

General Implications and Advantages

Programs for teaching programs employing such a sequence of rules would require the following information and advantages:

1. A well-organized set of phonetic rules that (a) the program could identify and (b) the user could reasonably understand, but which he had not learned before in print.
2. The ability to create a properly delineated set of lexicon items, and a means of determining that capitalization and other variations in the word data did not typically occur.
3. The ability to place in the regularity of the feedback loop the maximum number of words that could be used in the program without

- predictability. Instruction also specifically points out those words containing a correspondence which is not predictable.
4. The most productive and most useful rules are introduced early. Thus, many words are initially available upon presentation of few rules.
 5. Instruction is simplified by focusing on individual correspondence rules. Extensive practice is made available for each new rule by means of words containing that rule as their only novel component.
 6. Environments are presented as pronunciation environments for many rules for which such is the case. Knowledge of rule environments thus becomes particularly valuable for deriving words not previously encountered in print.
 7. Systematic simple-to-complex instruction follows from the beginning.
 8. The large number of words permits construction of equivalent, but not identical, word sets in structure, internal, reading order, word-track exercises, and criterion-attainment checks.
 9. Grouping words according to common generalization points (e.g., vowel examples for instruction focusing on a rule, whether or not that rule is made explicit to the reader) to degree to which the rule will be used for the derivation of new words. Instructional decisions yet to be determined.
 10. Correspondence can be put to use in a delayed fashion not mediated by a lot of information which must be memorized in a text-free context.

11. The large pool of available words is classified according to an instructionally practical, accurately detailed system of spelling-to-sound correspondence rules. Such specificity provides a basis for accurately decoding words by applying rules to the pronunciation of words containing those ~~rules~~.

The sequence which will now be described and discussed is the product of numerous and extensive critical analyses and revisions, and is considered sufficiently refined to warrant a moderately large-scale trial of a prototype product employing this sequence.

Section 1

General Sequencing Criteria and Methodology

Development of Rule Sequence for Block 1

Hesberg and Cronnell (1969) presented a preliminary sequence reflecting the criteria given under "Statement of Task" (pp. 6-7) with primary emphasis on productivity of each rule within the entire lexicon. However, in their report, the primary vowels, secondary vowels, and consonants were sequenced separately. For the reading program, the vowels and consonants had to be combined to produce exemplars, so Hesberg and Cronnell's preliminary sequence was revised. The most productive vowel and consonant rules in that sequence were chosen as the content of Block I. (The rationale for other Block and Unit divisions will be discussed below). These rules were combined, and a listing was made of the number of words containing only those rules. This information enabled the rules to be ordered on the basis of productivity within the non-restricted lexicon.

The code A15, I15, and E15 ($\underline{a} = 1$, $\underline{i} = 2$, $\underline{e} = 3$) were the most productive primary word rules. Therefore, a count was made of the number of words that could be formed by combining each of those vowels with the most productive consonants to form every possible 2-, 3-, or 4-letter formation. (Given these constraints, five-letter words were not considered, since they were relatively

[illegible]

infrequently. This count yielded a ranking of productivity of the various rule combinations. The four rules which constituted the most productive combination were chosen for part 1 of Block 1. Four rules were required to produce 10 words, but this seemed to be a manageable learning load.

For the rest of block 1, the remaining rules were sequenced by comparing the number of words introduced after combining each rule with the rules already introduced. Each new rule was sequenced at the point where, of all the remaining rules, that rule made the greatest increase in the number of words introduced.

General Sequencing Criteria

In order to determine a sequence for the rules beyond Block 1, two general criteria are employed: productivity and complexity. The relatively more productive and less complex rules were sequenced first. Productivity is determined by:

1. Number of words in the lexicon containing that rule,
2. Age frequency of the words in the lexicon containing that rule,
3. Age range.

Complexity is determined by: 1. Retrievability. The following were the principal criteria used in the complexity:

1. Number of phonological units in the rule. (Because of the complexity of the rule, the number of graphemes in the rule.)
2. The number of phonemes associated with the graphemes in the rule. (The number of phonemes associated with the graphemes in the rule is determined by the number of phonemes in the corresponding rule. For example, the phonemes in the rule $\text{p} \rightarrow \text{p} \rightarrow \text{p}$ are p , p , and p . The phonemes in the rule $\text{p} \rightarrow \text{p} \rightarrow \text{p}$ are p , p , and p . The phonemes in the rule $\text{p} \rightarrow \text{p} \rightarrow \text{p}$ are p , p , and p .)

2. Environment complexity. To determine the pronunciation of a grapheme unit in a particular exemplar, how much must be known about the surrounding letters or about the grapheme unit's position within the exemplar (i.e., is it at the beginning, middle, or end of the word?). The more letter-specific the environment must be to determine the pronunciation, the more complex the rule (e.g., Rule A23: $\underline{a} \rightarrow [ɔ] / _ \begin{cases} |l| \\ |k| \\ |t| \\ |d| \end{cases}$ is considered more complex than Rule A15: $\underline{a} \rightarrow [æ] / _ C(C) \#$).
3. Environment similarity. How similar is the rule's environment to the environments of other rules (with different pronunciations) for the same grapheme? A rule is relatively complex if it involves the same environment as another rule specifying a different pronunciation for the same grapheme. For example, the Rules 0011 and 0012 are complex in this regard since 0011 ($\underline{oo} \rightarrow [u]$) shares many environments with 0012 ($\underline{oo} \rightarrow [ɔ]$), so those environments cannot specify the correct pronunciation.
4. Environment generalizability across grapheme units. Does a specific type of environmental constraint apply to more than one grapheme unit? If, for example, a vowel rule involves the same environment recently learned for a different vowel, then that rule is considered less difficult to learn than if it had a unique environment (e.g., general primary vowel rule 11).
5. Functional similarity of the environment. Does the rule expand an environment already learned for the same grapheme-phoneme correspondence? For example, general primary vowel

1. type of grapheme unit (e.g., primary vowels vs. secondary vowels);
2. generalizability across correspondences (e.g., the vowel classifications VCe, VCC, Vr, schwa),
3. rule frequency;
4. single letters vs. digraphs;
5. phonological similarity or identity (e.g., the [i] and [y] correspondences for th; the [oi] correspondence for oi and oy);
6. environmental similarity (e.g., correspondences for a and o before l).

In addition, provisions were made in the sequence for introducing words of two, three, or four syllables at successive points. The general steps involved in sequencing words of more than one syllable are as follows (with two-syllable words as examples)

1. compounds (e.g., bedtime),
2. affixed forms (e.g., bigger),
3. words arranged by stress pattern (e.g., first syllable stressed rabbit, second syllable stressed until).

The 27 blocks varied greatly in the number of new rules introduced in each. The number ranged from zero, in blocks concerned with affixes or the review of previously introduced rules for polysyllabic words and other age-level words, to a high of 24 rules in Block 1.

The 27 blocks were grouped into four instructional year divisions. The 42 rules were based on manageable learning loads for the corresponding age groups through 3rd Grade, rather than on equally dividing the 42 rules of 2nd Grade into 4 parts. (First Year: 4 blocks, 44 rules, 50 exemplars; 2nd Year: 4 blocks, 43 rules + suffixes and -VCC exemplars,

Third Year: 8 blocks, 35 rules, plus affixes, "8-9 age level" words, and three-syllable words, Fourth Year: 5 blocks, 57 rules, plus affixes and four-syllable words.)

The resulting sequence of rule categories, by year, was:

1. First Year involves short vowels, single consonants, geminate consonants (e.g., nn, tt), and consonant digraphs (e.g., sh, th). All of the exemplars are one-syllable, one-vowel words. And instruction covers at least one pronunciation, the most frequent in the SWRL lexicon, for all letters of the alphabet (except g). The consonant digraphs sequenced in First Year are common digraphs contained in high-frequency words. The short-vowel rules are introduced before the long-vowel rules because the short vowels are more frequent, and have simpler environments, in that their one-syllable exemplars each contain only one vowel, with that vowel always pronounced. The consonant, digraph, and other vowel rules specified for first-year instruction are generally of high frequency and/or relatively low complexity.
2. Second Year introduces long vowels, other high-frequency primary vowel rules, secondary vowels, and additional consonant digraphs. Two-syllable words, commencing with compounds, and inflectional endings, enter the sequence in Second Year, and instruction covers the vowel stress pattern variation of these two-syllable words. The primary vowel rules involved in Second Year, besides the long-vowel -Vle rule, are the correspondences for vowel lengthening l, short vowels in two-syllable words (-VCC...), and

unstressed vowels having an [ə] or [ɪ] pronunciation. In addition, there are six alternate vowel pronunciation rules introduced which account for high-frequency words considered to be exceptions to the regular short- and long-vowel rules. The secondary vowels entering the sequence here are of high frequency.

3. In Third Year, 8-9 age-level words, as well as 6-7 age-level words, are utilized as exemplars for the rules introduced. The sequence includes the following: three-syllable words; high-frequency primary and secondary vowel rules; low-frequency consonant rules, silent letters; two- and three-syllable words with affixes; major palatalizations; and stress patterns for three-syllable words.

4. The Fourth Year sequence covers the remainder of the rules of correspondence, i.e., primary and secondary vowel rules of low frequency and low utility. In addition, four-syllable words are introduced, including those with affixes and those with palatalizations.

5. The Fifth Year sequence, rules, and exemplars.

6. A computer program sequence for the rules of correspondence, a computer program for applying the sequence to the entire lexicon of 100,000 Englishable words. This program was designed to search for the words containing each rule, the words containing that rule

7. A computer program for their application to the entire lexicon, and a computer program executed the computer processing.

in combination with rules previously introduced. Each word appeared as an exemplar of only one correspondence, all other correspondences in the word having already been introduced. In addition to the main purpose of listing sequenced rule exemplars, the computer program also provided a count of the number of words listed upon the introduction of each rule, the number of words listed for each unit of rules, and the number of words listed for each Block of rules. The word lists and frequency counts are given in Volume II, Section II. The program was run separately for the portion of the lexicon designated as appropriate for the 6-7 year-old age group, and again for the 8-9 age-group portion. See Appendices F and G for detailed descriptions of the computer programs for the rule sequence.

In addition to the computer-processed sequence, the uncoded words of three or more syllables were arranged in the sequence by hand. Upon the addition of these words, several more correspondences were established to account for additional spelling-to-sound relations found in the larger lexicon, thus augmenting the total number of sequenced correspondences from 100 to 125.

Also, a parallel study (Cronnell, 1969) was made of spelling-to-sound correspondences in nearly 500 common proper names (primarily first names, and some high-frequency surnames). These names (both regular and exceptional) were arranged according to the sequence and principles outlined above. Volume II, Section IV lists these sequenced proper names.

with the following sequential criteria:

1. A list of the computer listing of exemplars for each rule in the sequence revealed that certain words were simpler and clearer examples of the rule than were other words in the same list. Consequently, the exemplars of each rule were subgrouped, primarily according to the location of the exemplified grapheme unit in those exemplars. Then an order of subgroup order was established, based on predicted effectiveness and clarity of rule exemplification in each word group.

2. The following order was used for this order, which is basically the same as that for the consonant and digraph rules, are:

1. Location of grapheme unit - initial, final, medial, in that order of difficulty;

2. Number of syllables - more syllables mean greater difficulty;

3. Frequency - more frequent environment offers more exemplars for presentation.

4. Within each rule exemplars, within a section were further ordered in the following order of descending preference:

1. Words containing single consonants,
2. Words containing geminate consonants,
3. Words containing consonant digraphs,
4. Words containing consonant clusters,

5. Within each rule exemplars within a section were also ordered in the following order of descending preference:

1. Words containing short vowels,
2. Words containing long vowels,
3. Words containing long vowels,

the exemplars containing secondard vowels,

the pronunciation of the vowel(s) in an exemplar will be somewhat affected by the consonant it precedes if that consonant is r, l, or a nasal (n, m, ng).

When there was no criterion for division, or when the number of exemplars was small, words were alphabetized. Within each subgroup, words were also alphabetized.

Volume II, section II lists the exemplars for each rule, subgrouped according to the within-rule sequencing criteria described. More specific criteria also utilized are discussed in Volume II, Section I.

Irregular Words

Approximately 10 percent of the one- and two-syllable words in the word lexicon are labeled "irregular" (numbered as a Rule 40). These words have at least one pronunciation or environment which is not accounted for by any of the rules in the program. Such exceptions were grouped together separately from the regular words, but according to the same criteria described above for the regularly-spelled words. For the purpose of the sequence processing, the irregular rule(s) within each word was designated as equivalent to its earliest appearing regular counterpart (e.g., #40 = A15). In addition, each word was not sequenced until all the regular correspondences within it had appeared in the lexicon. Thus, the irregular words were computer sequenced according to their earliest possible occurrence. In general, it was assumed that irregular words would enter the exemplar sequence with the same frequency as the regular words to which they were similar, or to which they were specific.

exceptions, provided that all of their regular rule components had already been introduced. To accomplish this, some of the irregular words had to be "hand-moved" in the sequence.

It is recognized, of course, that many exceptions are high-frequency, high-utility, useful and necessary for reading text syntax, and which for that reason in reading materials must be used earlier than now placed in the sequence. In fact, a reading program could well begin with 15-20 high-frequency and high-utility sight words (primarily irregular), rather than beginning moderately with rule-based words, in order to more closely approximate spoken language in the reading texts. Most irregular words contain only one irregular correspondence. (While 10 percent of the one-syllable and two-syllable words in the lexicon are irregular, their irregular components account for only 3 percent of the total number of graphemes in the lexicon.) This being the case, after rules are introduced, reinforcement can still be given the reader for decoding the regular part of an irregular word, thus again emphasizing the high degree of regularity in English spelling-to-sound correspondences.

These exceptions can be handled by additional correspondences when a larger lexicon is used. Moreover, even when there are exceptions to the basic correspondences (primarily due to environmental constraints), the orthographic representation for a grapheme unit are rarely involved. For example, only 55 different base words plus their derived forms (e.g., under, underneath, into, onto, and unto) account for 21 percent of the exception words. If a reader can learn a group of basic sight words and the basic correspondences, they should be able to decode most words.

consideration should also be given to allowing contractions, abbreviations, and bound morphemes early in a reading program. Without these, sentences often tend to be awkward and unnatural. For example, using the words let us both when meaning "allow us" and for the imperative "let's" is not only awkward but confusing. If contractions, such as isn't, won't, and didn't are not allowed, then questions involving their full forms will always have to be asked in the positive form (e.g., Is he going to the store?), even when the negative form might be more appropriate from the context (presumably one is not going to write "Is he not going...?"). The use of common contractions might also decrease the length of time beginning readers read in a stilted, word-by-word fashion, since such contractions would make the texts more like spoken language.

High-frequency abbreviations such as Mr. and Mrs., and others such as Dr., St., Ave., a.m., and p.m. might also be considered for inclusion, beginning at least in the second year of instruction. See Cronnell (1970) for a description and sequencing of contractions and abbreviations.

Variation may change tense unnaturally within beginning stories. Constraints are placed on the scripting by the absence of bound morphemes, such as -s, -es, (plurals and third-person singular), -ing (progressive present tense and the "going to" future) and -ed (past tense endings). There tends to be a lack of consistency both within the narration itself and between the narration, dialogue, and illustrations. Often, the choice of tenses can easily result in being based on the text vocabulary available rather than on natural use. Thus, for example, it is possible that the regularly-spelled, but irregular tense

form, ran would be allowed but not the regular base plus -ed, jumped. And for the sentence, "Look at Dan; he's jumping on the bed," the storywriter might have to substitute, "Look at Dan; he jumps on the bed," even when the latter has the connotation that Dan does this quite often.

Investigations should be made to determine whether the additional learning loads involved with contractions and such bound morphemes as -s, -ing, and -ed are really great enough in the first year of instruction to warrant sacrificing natural speech and possibly even hindering comprehension and reading fluency.

Grapheme Pronunciation Variability

As discussed above, the SWRL Reading Program incorporates two types of spelling-to-sound rules of correspondence: "regular" rules with predictable pronunciations usually occurring in specifiable environments; and "irregular" rules with correspondences considered too unproductive to be classified as regular rules, or with exceptions to regular rules. An irregular correspondence of this latter type is one with a pronunciation not already covered by a regular rule, or one with a regular pronunciation occurring in an environment different from that specified by the regular rule.

Most consonant and secondary vowel grapheme units have only one or two regular pronunciations. And for all consonants but ng, s, and th, and for all secondary vowels but ie, there is only one regular rule per pronunciation. Primary vowels, however, each have an average of 6 regular pronunciations covered by 13 rules. Consonants and secondary vowels have an average of one or two irregular pronunciations. These

irregular correspondences involve pronunciations other than those covered by regular rules, except in a minority of cases where one and occasionally two of the pronunciations are the same as regular rules that occur in different environments. Primary vowels, on the other hand, have an average of 7 irregular pronunciations, one-half of which are the same as those accounted for by regular rules; they are irregular in that they occur in different environments.

Confronted with the large number of correspondence rules (186, although many of the vowel rules could be combined and then generalized over the primary vowels), and faced with the environmental details prescribed by the rules, the learner might lose sight of the degree to which the most important information to be gained about each grapheme (its pronunciation)--can be condensed from rule information. Another aspect of this pronunciation overview that the learner might find useful is that the pronunciation variability is much lower for secondary and tertiary vowels than for primary vowels, and that the learner therefore has to concentrate more on environment specification for the primary vowel rules for indications of correct pronunciation than for all the other rules.

In section I of appendix B, there is listed for each grapheme unit, all of its possible pronunciations and the rules (or the specific letter and) which cover each of the pronunciations. In Section II of appendix B, graphemes are grouped according to pronunciation variability. The purpose of grouping graphemes by their degree of variability was to determine which graphemes could, at the very least, have one or two pronunciations associated with

graphemes with little or no emphasis on environmental information, and which can require information about the position of the grapheme in that regular to determine the pronunciation.

Five categories of pronunciation variability are listed. Beginning with graphemes having invariant pronunciations, the categories are presented in order of increasing grapheme pronunciation variability. Within each category, the order of graphemes is: single consonants, geminate consonants, digraphs, primary vowels, and secondary vowels.

The data indicate that geminate consonants are invariant or very nearly so, with the only exception being ss, which has one major pronunciation and two minor ones. Single consonants tend to have a major pronunciation with a few irregular exemplars, or to have a major pronunciation and a secondary pronunciation. The only consonants which could not be fit into this description (by acknowledging automatic deletion of the final t, the reader of the correct allophones for d and n, for example) are s, z, ʒ, and ʃ. Consonant digraphs have one or sometimes two pronunciations, with the exceptions being ch and ng (and the latter's pronunciation depends on environment). Secondary vowels have one or two pronunciations, except for ea and ou which each have more than three pronunciations. Primary vowels are highly variant, with an average of seven pronunciations.

In all, one-half of the 69 grapheme units used in the rules have one pronunciation, with the allowance of 1-6 exception words; one-third have two pronunciations, with the allowance of 1-6 exception words; and only the remaining one-quarter have three or more pronunciations.

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Section II

Specific Rule Sequence, Criteria, and Comments

Summary of Rule Sequence

First Year

(One-syllable words, Single consonants; Geminate consonants; Digraphs;
Short vowels)

Block 1 (Highest frequency single consonants; Geminate consonants;
General primary vowel Rule 15: short vowels)

1,1 N10, NN10, T10, (TT10)^c, A15, I15

1,2 P10, (PP10)

1,3 L10, LL10, S10, SS10

1,4 D10, DD10, E15

1,5 M10, (MM10), B10 (BB10), U15

1,6 R10, (RR10), H10, O15

Block 2 (Consonant digraphs)

2,1 SH10

2,2 TH13, IH11

Block 3 (Geminate vowel; Long vowel at end of word)

3,1 EE10, E25

3,2 Y19

See appendix B for the pronunciation, rule description, and example of each rule.

Block 1 double consonant rules in parentheses have no exemplars at the point where they are listed in the sequence. Nevertheless, they are included--with their corresponding single consonant rules--because the rules have the same pronunciation. In Appendix C, it is noted here exemplars of the parenthesized rules first appear.

Block 4 (Less frequent consonants)

4,1 F10, FF10, W10

4,2 K10, N20, C12, CK10

4,3 G12

4,4 J10, X10, Y10

4,5 V10, Z10, ZZ10

Second Year

(Two-syllable words; Long-vowels; Vowel-r; Other high-frequency vowel rules; High-frequency digraphs; Unstressed vowels; Common exceptions vowel rules; High-frequency secondary vowels)

Block 5 (Compounds; Suffixes; NG10)

- 5,1 Compounds using first year rules (first syllable stressed)
- 5,2 -ing suffix with previously introduced base words
- 5,3 -es suffix (plurals and third-person singular, present tense forms) of previously introduced base words
- 5,4 -ed suffix (past tense) of previously introduced base words
- 5,5 NG10 (one-syllable words)

Block 6 (General primary vowel Rule 11)

- 6,1 E18, A11, I11
- 6,2 G11, U11, E11, EE10 + E18

Block 7 (G11, G11; Suffixes with general primary vowel Rule 11)

- 7,1 G11, G11
- 7,2 -s, -d, and -ing suffixes added to words with general primary vowel Rule 11.

Block 8 (Two-syllable words, first syllable stressed)

- 8,1 Compounds with rules in Blocks 5-7
- 8,2 A16, L16, U16, E16, O16 (two-syllable words, first syllable stressed)

Block 9 (Vowels before r)

- 9,1 A21, O21, U21, I21, E21 (one-syllable words)
- 9,2 E21 (plus -er suffix with previously introduced words),
O21, I21, A21, U21 (two-syllable words, first syllable stressed)
- 9,3 A25, O22

Block 10 (Unstressed vowels, Two-syllable words, second syllable stressed)

10,1 U17, E17, A17, O17 (first syllable stressed)

10,2 Y17, EE22

10,3 Compounds (second syllable stressed)

10,4 U16, U16, A16, O16, E21, O21, EE10 (two-syllable words, second syllable stressed)

10,5 A17, E17, O17, U17, I17 (second syllable stressed)

Block 11 (Consonant digraphs: GG10, CC12, G31)

11,1 NG10 (two syllables)

11,2 CH10, TCH10

11,3 WH10

11,4 ZU10

11,5 GG10, CC12

11,6 G31

Block 12 (High-frequency, secondary vowels)

12,1 A12

12,2 E11, E31

12,3 I11, I12

12,4 OW1, OW2

Block 13 (Additional secondary vowel rules)

13,1 31, 31

13,2 43, 623

13,3 122, 124

Block 14 (Long vowels, VC(C) words)

14,1 Unstressed VCC

14,2 Unstressed VC(C)

14,3 Stressed VCC and VC(C)

Third Year

(8-9 age-level words; Three-syllable words; Medium-frequency primary and secondary vowels; Low-frequency consonants; Silent letters; Major palatalizations; Affixes; Stress patterns)

Block 15 (Review, employing 8-9 words covered by First- and Second-Year rules)

15,1 8-9 one-syllable words with First-Year rules

15,2 8-9 words with Second-Year rules

Block 16 (Secondary vowels of medium frequency)

16,1 A110

16,2 OUI0

16,3 OEI0, OA10

16,4 AWI0, AU10

16,5 OI10, OY10

16,6 UEI0, UI10, EW10

Block 17 (Suffixed and compound three-syllable words; Suffixes)

17,1 Three-syllable compounds

17,2 Two-syllable words with suffixes: -er, -en, -ing, -y,
-s, -ed

17,3 Three-syllable words with suffixes: -er, -en, -ing,
-ed, -ly

Block 18 (Primary-vowel and single-consonant rules of medium frequency)

18,1 E13, O13, A13, I13, U13

18,2 S20, S21

18,3 A22

18,4 I25

Block 19 (Silent letters)

- 19,1 Three-syllable words with suffixes -ment, -or, -ive,
-ness, -ance, -ant
- 19,2 IE11, I24 + GH10, GH10, H20
- 19,3 K20, G20, W20
- 19,4 B20
- 19,5 L20, T20
- 19,6 C20

Block 20 (Consonant digraphs; Double Consonants)

- 20,1 Three-syllable words with suffixes: -y, -ful, -al,
-able, -eth, -less, -ist, -ish
- 20,2 PH10, CH31
- 20,3 TH12
- 20,4 CC11

Block 21 (Palatalizations)

- 21,1 Three-syllable words with prefixes un-, re-, dis-,
im-, mis-
- 21,2 -tion
- 21,3 -tion
- 21,4 -tion

Block 22 (Stress patterns in three-syllable words)

- 22,1 stress pattern 3B
- 22,2 stress pattern 3A
- 22,3 stress pattern 3C
- 22,4 stress pattern 3'

Fourth Year

(Low-frequency primary and secondary vowels; Four-syllable words;
Affixes; Four-syllable stress patterns)

Block 23 (Specific primary vowel rules)

23,1 A29, A24

23,2 I35, I25

23,3 Y11, Y13, Y15, Y16

Block 24 (Four-syllable words; Rules for exceptions to general primary
vowel Rule 13)

24,1 Four-syllable compounds

Four-syllable words with suffixes: -ing, -y, -er, -or,
-en, -ed, -ly

24,2 E38, I38, A38, O38

24,3 A29, I28, Y28, O28, E28

24,4 General primary vowel Rule 27

Block 25 (Remaining general primary vowel rules)

25,1 Four-syllable words with -tion

25,2 I26, Y26, U26, E26, O26, A26

25,3 I26, Y36

25,4 A12, I12, Y12, O12, U12

25,5 E14, I14, Y14, A14, O14, U14

Block 26 (Low-frequency secondary vowel rules)

26,1 Four-syllable words with suffixes: -able, -ment, -al, -ness,
-ary, -ist

26,2 I17, Y17

- 26,3 A117
- 26,4 EA33
- 26,5 IE12, E110
- 26,6 EY10, E120
- 26,7 -ous, OU31, OU35, OU33, OU34
- 26,8 U131

block 27 (Four-syllable words; General primary vowel Rule 32)

- 27,1 Four-syllable words with prefixes: un-, in-, dis-, mis-
- 27,2 Stress pattern 4A and 4B
- 27,3 Stress pattern 4C
- 27,4 Stress pattern 4D
- 27,5 Other four-syllable words (miscellaneous, stress patterns)
- 27,6 E32, O32, A32, I32

DETAILED DISCUSSION OF RULE SEQUENCE

First Year

One-syllable words; Single consonants; Geminate consonants; Digraphs;
Short vowels)

Frequency = 796

Block 1 (Highest frequency single consonants; Geminate consonants;
General primary vowel Rule 15: short vowels)

Frequency = 315

Unit 1	NI0, NN10, TI0, (TT10), AI5, I15	Frequency = 10
Unit 2	PI0, (PPI0)	Frequency = 11
Unit 3	LI0 (7), LL10 (3), SI0 (27), SS10 (3)	Frequency = 40
Unit 4	DI0 (14), DD10 (1), EI5 (32)	Frequency = 47
Unit 5	MI0 (32), (MM10), BI0 (28), (BB10), UI5 (41)	Frequency = 101
Unit 6	RI0 (45), (RR10), HI0 (22), OI5 (39)	Frequency = 106

As explained in detail above, preparatory to specifying the contents of Block 1, the relative frequency of occurrence within the entire lexicon was determined for each single-grapheme consonant rule. The nine identified as being the most frequent (r, t, n, l, s, d, p, m, b) were then combined with the short-vowel rules. It was decided that instruction on short-vowel rules could precede instruction on long-vowel rules because the short-vowel rules are more productive and less environmentally complex than the long-vowel rules. The central concern at this point was that the sequence should begin with the most productive combination of rules. The next concern was to eliminate words considered to be difficult for initial reading instruction (e.g., ass, bade, pith).

Next, the relative frequencies of individual rules

reintroduced and contrasted. Geminate consonants which have no exemplars at their time of introduction are reintroduced as their exemplars enter the sequence.

While double consonants occur in English orthography, they are not allowed in English phonology, except across word or morpheme boundaries, e.g., bockcase, unknown. (In some languages, such as Italian, double consonants are phonemically distinct from single consonants.) Geminate correspondences do not occur in word-initial position. They are primarily found in medial position in words, with the following environment

single letter \rightarrow geminate $/\tilde{V}_ \left\{ \begin{matrix} v \\ l \\ y \end{matrix} \right\}$.

The only geminates in final position which have more than three SWRL lexicon exemplars are ck (a digraph which functions as the nonexistent kk geminate would), ff, ll, ss and zz. There are no geminates for n, j, z, w, x, and v.

except for the Spanish borrowing llama, [and Welsh Lloyd and Llewellyn] geminate consonants occur only in medial and final position in English spelling. The most common final clusters are ff, ll, and ss.... Rare final clusters are bb, dd, gg, nn, rr, tt, and zz.... (Venezky, 1970, p. 106, fn. 8).

L1 ll \rightarrow ll, e.g., an

NN10 nn \rightarrow nn, e.g., inn

T10 t \rightarrow tt, e.g., at

TT10 tt \rightarrow tt, e.g., little, mitt

A15 a \rightarrow a / __C(C)#, e.g., at, ant

115 i \rightarrow i / __C(C), e.g., it

In this notation, the first number signifies the block, and the second the unit.

Exemplars in parentheses are introduced in later blocks. No exemplars of their particular environments enter in the blocks in which the rule in question is sequenced.

As discussed above, Unit 1 is composed of the rules N10, T10 (plus their geminate rules), A15, and P15, these being the rules which together produce the best, albeit a small number of exemplars (10).

NN10 The geminate grapheme nn has the invariant pronunciation [n:] as in NN10. The only words in modern English with final nn are inn and proper names.

TT10. The geminate grapheme tt has the invariant pronunciation [t:] as in TT10. Final tt occurs in only two lexical items (butt, mitt) and proper names. However, final tte, pronounced [t:], also occurs finally (barrette, brulette, and rosette). Although TT10 is sequenced here in Block 1, Unit 1, for reasons discussed above, the first occurrence of TT10 exemplars is in Block 9, Unit 2.

A15 In certain dialects, some words may use [a], e.g., Eastern and British glass, dance.

1.2 T10 p → [p] as in pin

PP10 pp → [p:] as in pop

Unit 2 was found to require a rule to compensate for the relatively large instruction load of Unit 1. The rule selected for Unit 2, P15, is the rule which, when added, produced the best exemplars in combination with the rules in Unit 1.

PP10 The geminate grapheme pp has the invariant pronunciation [p:] as in PP10. There are no occurrences of final pp, except in proper names. The first occurrence of PPP exemplars is in Block 9, Unit 2.

- 3.3 L10. l → [l], e.g., lip
 LL10. ll → [ll], e.g., pill
 S10. s → [s], e.g., sat
 SS10. ss → [ss], e.g., pass

The remaining short-vowel and high-frequency, single-consonant rules were combined and rank-ordered by additive productivity. They were then divided into Units 3-6. In Unit 3, the rules L10, S10, and their geminates are sequenced.

L10: The grapheme l has only two pronunciations: [l] as in L10, and [ɫ] as in L20 and L40, except for in the word colonel.

LL10 The geminate grapheme ll has the invariant pronunciation [ll] as in LL10, except in borrowed Spanish words; e.g., tortilla. LL is the most frequent consonant geminate in the lexicon.

SS10 After ll, ss is the second most frequent double consonant in the present lexicon. A large number of its occurrences are in the suffixes -less, and -ness, introduced in Second Year.

S10 Following the introduction of S10, both s → [s] and s → [z] plurals and 3rd-person singulars of exemplars are allowed in order to facilitate the approximation of natural speech in the beginning stories. The correct pronunciations of regular plural morphemes are automatic in speech (e.g., [tʰ] vs. [t] vs. [tʰ] [1ʰ]). But since the appropriate response to the printed s may not

510, cont.

occur automatically, instruction may explicitly acknowledge the alternative [ɪ] and [i] pronunciations of the morpheme -s and the exemplars could be separated for instruction on [s] and [ɪ] pronunciations. The [ɪ] pronunciation of -es is sequenced in Year 2 because of the additional, unstressed vowel. The [ɪ] pronunciation of the inflectional ending -s is the first instance of an alternative to a grapheme unit's most frequent pronunciation, and the first step in preparing the learner to make varying pronunciation responses to a single letter. For all other rules in Block 1, only one pronunciation per letter will be taught. Rule environments will not be made explicit at this point, since alternative pronunciations depending on contrasting rule environments are not yet presented.

1.4 010 ed + __, e.g., did

010 ad + __, e.g., add, hidden

E11 e + __ (/__/), e.g., set, lend

Unit 4 is composed of 010, 010, and E15.

010 Verb past tenses are presently introduced in Second Year because of the variation in the pronunciation of the y as well as the d in the -ed endings (e.g., add, hidden, set, lend). If however, it is found that these variations are not difficult for beginning readers to learn, then it is advised that the suffix -ed be added in Block 1, as was -s, in order to better

BB10. The grapheme ai in the natural speech is the ai diphthong. The same suggestion is made very strongly for the verb suffix -ing, and also to a much lesser degree for the bound morpheme suffixes -er, -y, and -ly (all of which are presently sequenced in Second Year).

BB10. The grapheme dd has the invariant pronunciation [d] as in BB10. The only words, besides proper names, in modern English with final dd are add and odd.

BB10. The grapheme an has the invariant pronunciation [ən] as in BB10, e.g., man.

MM10. The grapheme ma has the invariant pronunciation [mə] as in BB10, e.g., (mammal).

BB10. The grapheme ut has the invariant pronunciation [ət] as in BB10, e.g., but.

BB10. The grapheme bl has the invariant pronunciation [bəl] as in BB10, e.g., (bubble).

BB10. The grapheme up has the invariant pronunciation [ʌp] as in BB10, e.g., up.

The graphemes in BB10 are BB10, their geminates MM10, BB10,

and BB10.

BB10. The grapheme na has the invariant pronunciation [nə] as in BB10, except in the non-lexicon words comptroller and napoleone.

BB10. The grapheme ba has only two pronunciations, [bɑ:] as in BB10, and [bæ] as in BB10 and BB10.

MM10. BB10. The geminate graphemes ss and tt have the invariant pronunciations [s] as in MM10 and [t] as in BB10, respectively. The first occurrence of their exemplars is in Block 9, Unit 1. There are no occurrences of ss or tt, except in proper names and other than proper names, the only words in modern English with final ss or tt are ass and cutt.

244 4 11

015. The 015 exemplars with the environment /__r have been recorded as U21s. For instructional purposes, they have been placed in Block 9, Units 1 and 2 with the other Vowel 21 exemplars. 015 and 016 /__r have the same [] pronunciation as E21 and I21.

1,6. R10. r → [r], e.g., run, (far)

RR10. rr → [r], e.g., (hurry)

H10. h → [h], e.g., had

015: o → [ɒ], e.g., hot, odd

Sequenced in Unit 6 are the rules R10, RR10, H10, and 015.

P10. The grapheme r has the invariant pronunciation [r] as in R10, except in the words acre and ogre. Also, in some dialects, the r following a vowel is dropped. Parallel to Rule LE22 (sequenced in Block 10, Unit 2) there could be a rule RE22: re → [ɹ] /C __, e.g., acre, ogre. As just noted, these are the only irregular r exemplars in the present lexicon.

PR10. The geminate grapheme rr has the invariant pronunciation [r] as in P10. The geminate rr occurs finally in only two lexical words (burrr, purr) and proper names. The first occurrence of PR10 exemplars is in Block 9, Unit 1.

H10. The grapheme h has only two pronunciations, [h] as in H10, and [ɸ] as in H20 and H40. There is no geminate hh. The frequency of H10 would have placed it in a later block. It was sequenced into Unit 6 of Block 1, however, due to the decision that the component graphemes

SH0, cont. (e.g., s, t, h) of a digraph (e.g., sh, th in Block 2) should be introduced before the digraphs themselves.

Block 2 (Digraphs)

Frequency = 50

Unit 1 SH10

Frequency = 28

Unit 2 TH13 (6), TH11 (16)

Frequency = 22

Digraphs are presented and employed as graphemic units because their pronunciation is not a combination of common pronunciations of their component letters. They are introduced in Block 2, prior to the remaining single consonants, because of the high-frequency function word exemplars of the digraph rule TH13 and the need for these function words in the story-instruction aspect of reading instruction.

2,1 SH10: sh > , e.g., shut

SH10 is the first rule taught in Block 2 because it is the highest frequency digraph and so was considered to be an appropriate choice for introducing digraphs. SH10 also has more exemplars with Block 1 graphemes than the remaining single consonants, sequenced in Block 4, 30. The grapheme unit sh has the invariant pronunciation /ʃ/ in SH10.

2,2 TH13: th > in pronouns, conjunctions,
and function words, e.g., then, them, this

TH11: th > , e.g., thin

In Unit 2, TH11 is introduced at the same time as TH13, which has the function word exemplars, because of the near identity of the two th correspondences, /θ/ and /ð/, which differ only in voicing.

as in Tbl2 and Tbl3. Tbl2 is not introduced at this point because it occurs in words with long vowels and/or two syllables.

Th12 also has a predictable environment and so will be sequenced after instruction employs rules which require attention to

10

...and, in the process, could say, "I taught the
...the ... incorrectly that had a ..."

the 2000 census, the population of the county was 10,300, an increase of 10% from the 1990 census. The population of the county was 10,300 in 2000, an increase of 10% from the 1990 census.

the authors of the present study, Marsh and Sherrin (1994) and Marsh, Sherrin, and Peterson (1996) have been instrumental in

• $\frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{1}{2} m \frac{d}{dt} (v^2) = \frac{1}{2} m \frac{d}{dt} (v_x^2 + v_y^2 + v_z^2) = \frac{1}{2} m \frac{d}{dt} (v_x^2 + v_y^2 + v_z^2) = \frac{1}{2} m \frac{d}{dt} (v_x^2 + v_y^2 + v_z^2)$ cannot be used to differentiate

[illegible][illegible]

th for the word to be blended. In the reading lessons, the Ss would simply be reminded of the alternate pronunciation whenever an error was made. Once Ss read fluently enough to be affected by syntactical constraints, there should be few errors made between the [θ] of th function words and the [ð] of th content words.

NG10 A third high-frequency digraph, NG10 could be added to Block 2. NG10 has a high rule frequency and its exemplars have high individual frequencies. If -ing verb suffixes are allowed in Block 1, as suggested, then the beginning reader should have no problem reading base words which include the grapheme unit -ing (e.g., sing, thing). And one-syllable NG10 base words having other preceding vowels (e.g., rang, rung) should then present little, if any, more difficulty. The unit -ong, however, might best be postponed until Block 13, Unit 3 (with the introduction of Rule 024), unless it is found that the readers are not confused by the dialect variation of o → [ʊ], or [ɔ]/ng.

Block 3 (Germate vowel, Long vowel at end of word)

Frequency = 51

Unit 1 EE10 (36), E25 (4)

Frequency = 40

Unit 2 Y19

Frequency = 11

The rules EE10 and E25 are positioned here in the sequence because their exemplars have high individual frequencies (i.e., they are common words). Rule Y19 is included because, like E25, it has a long vowel

pronunciation in an / (C)C__ environment (or in a stressed syllable).

Rule 025 would have been included here for the same reason except it has too few exemplars and it also has exceptions which themselves have high individual frequencies.

3.1. EE10: ee → /i:/, e.g., beet

E25: e → /e:/ (C)C__, e.g., we, she

The long vowel e geminate, EE10 (e.g., see) and the long vowel e, E25, at the end of one-syllable, one-orthographic-vowel words (e.g., he), expose the reader to and prepare him for alternate pronunciations of vowels (in this case, the long-vowel sound of e in VCe exemplars), which will be elaborated upon in later blocks. This block also adds to the concept of letters representing more than one pronunciation.

The grapheme e has an invariant pronunciation /i:/ in EE10, except in the words been, breaches, and creek (in some dialects), and in borrowed French words, such as matinee. The long-vowel pronunciation related to /e:/ from the double e stimulus is specific to __.

EE10 and E25 occur in an / (C)C__ (one-syllable) environment. The E25 exemplar has no other vowel, whereas an exemplar (to be introduced in Block 6) could have another vowel in VCe. The grapheme e in an / (C)C__ environment has the invariant pronunciation /i:/, except in the words we and the.

e in an initial position, introduced here higher frequency word (e.g., he, she) as a rule exemplar,

of the first part of the word. Also, attention is now focused on what will later be crucial word aspects, since this is the first instance of a pronunciation of a graphemic unit depending on an explicitly taught orthographic environment (in this case, the end of a word).

Y19: \underline{y} → $\underline{ɪ}$ / $\underline{\quad}$ in stressed syllables, e.g., try, happy

Block 2, Rule Y19 occurs in word-final position in one-syllable words, e.g., / $\underline{\quad}$ / . Y19 exemplars in stressed syllables will enter Block 6, Unit 2 when two-syllable words are introduced. (Final \underline{y} in stressed syllables has a Rule Y17 → $\underline{ɪ}$ or $\underline{ɪ}$ pronunciation, e.g., happy, city).

Block 6, Unit 2, Segment 6 (continuation)

Frequency = 350

FF10 (51), FF19 (9), W16 (31)

Frequency = 91

U10 (37), N20 (34), U12 (59), U19 (57)

Frequency = 187

Frequency = 65

Frequency = 65

U4 (15), U5 (12), U10 (14), Y10 (16)

Frequency = 32

U10 (12), U10 (12), U10 (11)

Frequency = 5

Block 6, the final block of First Year, includes the remaining graphemes and digraphs, those not taught in Block 10, as well as the digraph gn (15), the $\underline{ɪ}$ (lax) laxened allophone of n (Rule N20), which is taught in Block 10, and the digraph kn (11) introduced following the introduction of k. The orthographic and phonological model is relatively automatic and is not as difficult to learn explicitly as the first 10 blocks.

F10 f > f, e.g., fat

FF10 ff > f, e.g., stiff

W10 w > w, e.g., wet

Block 4's five most frequent consonants, in rank-order, are: K10 (+N20), G12, C12, F10, and W10. F10 and W10 have lower frequencies than do K10, G12, and C12. However, [f] and [w] do not have environment-dependent grapheme correspondences as does [r], and they do not have environment-dependent pronunciations as do c and g. Therefore, it was decided that F10 and W10 would be less difficult correspondences to learn and so would be more appropriate for Unit 1 than the other rules.

F10 The letter f has the invariant pronunciation [f] as in F10, except in the word of.

FF10 The geminate grapheme ff has the invariant pronunciation [f], as in FF10.

W10 The letter w has only two pronunciations: [w] as in W10, and [v] as in W20 and W40. There is no geminate ww.

N20 F10 k > k, e.g., milk

N20 a > a, $\left\{ \begin{array}{l} x \\ k \\ qu \\ g \text{ pronounced } [x] \\ c \text{ pronounced } [k] \end{array} \right\} \begin{array}{l} \text{(anxious)} \\ \text{(thank)} \\ \text{(banquet)} \\ \text{(single)} \\ \text{(Lincoln)} \end{array}$

C12 c > / — $\left\{ \begin{array}{l} a \\ o \\ u \\ t \end{array} \right\} \begin{array}{l} \text{cat} \\ \text{cot} \\ \text{cut} \\ \text{crash} \\ \text{(picnic)} \end{array}$

F10 ck > k, e.g., kick

The rules K10 (+N20), C12, and CK10 are combined for Unit 2 because they share a common pronunciation, [k].

K10: The letter k has only two pronunciations: [k] as in K10, and [ɒ] as in K20.

CK10: The digraph ck has the invariant pronunciation [k] as in CK10.

N20: Regarding the Rule N20, it is optional to acknowledge the automatic sound change of n → [ŋ] / $\left\{ \begin{smallmatrix} [k] \\ [g] \end{smallmatrix} \right\}$. Since Rule N20 is used in coding, this is where it should first have exemplars, due to Rule K10. Even if Rule N20 is not specifically taught, the exemplars would enter here.

C12: The most frequent and least complex pronunciation rules for the letters c and g are introduced in Block 4--the [k] sound of c and the [g] sound of g, as exemplified in the words call and gas. The alternative [s] sound of c and [ʃ] sound of g (e.g., ice, age) have a more complex environment and their occurrence is often associated with the long-vowel rule. Consequently, these two rules (C11 and G11) have been sequenced in Second Year, following the introduction of the long-vowel rules.

Rule C12 occurs in the environment / $\left\{ \begin{smallmatrix} \emptyset \\ u \\ c \\ \# \end{smallmatrix} \right\}$. This environment should be contrasted with the / $\left\{ \begin{smallmatrix} e \\ i \\ y \end{smallmatrix} \right\}$ environment of C11, when the latter is introduced in Block 7. The only lexicon exception to C12 (i.e., to

c → [k] for that environment) is the word muscle;

nonlexicon exceptions are czar, indict, facade.

4,3: G12: $\underline{g} \rightarrow [g] / _ \begin{Bmatrix} a \\ o \\ u \\ \text{C} \\ \# \end{Bmatrix}$ gas
got
gum
grin
bag

Rule G12 is sequenced in Unit 3, immediately following C12, because of their similarity in environmental constraints on pronunciations: c → [k] and g → [g] / — $\begin{Bmatrix} a \\ o \\ u \\ \text{C} \\ \# \end{Bmatrix}$. G12 has the same environment as C12, and it contrasts with G11 just as C12 does with C11. The geminates gg and cc are sequenced in Second Year because their pronunciation ([g] and [gʲ]; [k] and [ks]) are determined by the following vowel.

The only exceptions to G12 (i.e., to g → [g] for that environment) are the word judgment and the letter combination gn in which g → [∅] / $\{ \# _ n(e) \# \}$. Final g occurs only in a small number of words, mostly monosyllables.

Rule G31 (g → [g] / — $\begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$) is an exception to Rule G12 (g → [j] / — $\begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$), but it has the same [g] pronunciation as G12. G31 is presently sequenced in Block 11, Unit 6, but it could be resequenced here in Block 4, Unit with G12, although its only exemplars at that point would be get, gift, gig, and gill.

4,4: J10: $j \rightarrow [j]$ jet

X10: $x \rightarrow [ks]$ box
(oxen)

Y10: $y \rightarrow [y]$ yet

The consonants in Unit 4 (J10, X10, Y10) and in Unit 5 (V10, Z10, ZZ10) have very low frequencies. They are nevertheless included at the end of First Year so that, in order to encourage increased independence in dealing with words encountered outside of the program, beginning readers will have learned at least one (and the major) pronunciation of each letter in the alphabet. The letter q, represented by the digraph qu, was inadvertently omitted from Year 1. QU10 would have only 7 exemplars if sequenced in Block 4, Unit 5. However, it should probably be included for the same reason V10, Z10, and ZZ10 are--to provide one pronunciation for each letter.

J10: The letter j has the invariant pronunciation [j] as in J10, except in borrowed Spanish words, such as frijoles and marijuana, and in the nonlexicon word, hallelujah. There is no geminate jj. The letter j generally occurs initially, sometimes medially, and never finally; nor can it occur doubled. The grapheme unit dj is used instead of doubled j, and dge or ge is used instead of final j.

X10: The letter x has only two pronunciations. [ks] as in X10 and [gz] as in X40, except for the [z] pronunciation in initial position, as in such nonlexicon words as xylophone, xerox, and xylem. The letter x in final position is always pronounced [ks] as in X10. There is no geminate xx.

Y10: As a consonant, the letter y has the invariant pronunciation [y] as in Y10. It is relatively infrequent in Modern English, occurring primarily in initial position, and in medial position in the words beyond, canyon, and lawyer. The letter y occurs nine times more often as a vowel than as a consonant. There is no geminate yy.

4,5: V10: v → [v] vest
 Z10: z → [z] zig-zag
 ZZ10: zz → [z] buzz
 (dazzle)

V10, Z10, and ZZ10 are sequenced last in First Year due to their very low frequency.

V10: The letter v has the invariant pronunciation [v] as in V10. When [v] is final in a word, v is always followed by e (e.g., have, sleeve), except in names and the slang term rev. Double v is rare in English, and there are no lexical exemplars.

Z10: The letter z has the invariant pronunciation [z] as in Z10, except in the words waltz, glazier, and azure, and in nonlexicon borrowed French words, such as rendezvous. The letter z is the least frequently used letter in Modern English.

ZZ10: The grapheme unit zz has the invariant pronunciation [z] as in ZZ10, except in the word pizza. The geminate zz occurs finally only in the words buzz,

fuzz, and jazz. The first occurrence of ZZ10 exemplars is in the Block 10, Unit 1.

Since there are only five lexicon exemplars of V10, Z10, and ZZ10 at this point in the sequence, others could be introduced orally, and instruction on the correspondence should be repeated, if necessary, when other exemplars enter the sequence in Second Year.

Second Year

(Two-syllable words; Long-vowels; Vowel-r; Other high-frequency vowel rules; High-frequency digraphs; Unstressed vowels; Common exceptions to Vowel rules; High-frequency secondary vowels)

Frequency = 2299

Block 5 (Compounds; Suffixes, NG10)

Frequency = 68 (plus base words with suffixes)

Unit 1: Compounds

Frequency = 36

Unit 2: The -ing suffix with previously introduced based words.

Unit 3: The -es suffix (plurals and third-person singular, present tense forms) with previously introduced base words.

Unit 4: The -ed suffix (past tense) with previously introduced base words.

Unit 5: NG10

Frequency = 32

Block 5 introduces two-syllable words, beginning with their least complex compounds and inflectional endings. Unit 1 contains compounds of previously introduced words, Unit 2 contains -ing endings of lexicon base words, Unit 3 contains the -ed ending for past tense and adjectives, and Unit 4 contains the -es ending for plurals and third-person singulars of base words. The exemplars in Units 1-4 involve First Year rules. They will thus serve as a review of pronunciation rules already covered, in addition to introducing the concept of syllables. Although environments can be specified for the [d], [t], and [ɪd] pronunciations of the -ed endings, it is not planned to teach these environments. Exemplars may, however, be grouped for instruction and practice according to these various pronunciations. The digraph -ng is also introduced in one-

syllable NG10 exemplars since the pronunciation is the same as in the -ing suffixes of Unit 2.

5,1: Compounds using First Year rules (first syllable stressed), e.g., bathtub

In Unit 1, lexicon compounds using First Year rules are introduced, but nonlexicon compounds of other previously taught base words are also allowed. For example, the word standstill is not in the lexicon, but could be introduced here because its components stand and still have already entered the sequence.

5,2: -ing suffix with previously introduced base words, e.g., running

In Unit 2, which introduces the -ing gerund suffixes of base words, exemplars are presently uncoded, but could be separated for instruction between those which do have to double the final consonant of the base word before adding the -ing suffix (CVC base words where the final consonant is not an x) and those which do not. The -ing noun and adjective forms of base words, which are less frequent than the verb form, could be introduced either here or where now sequenced in 11,1 with two-syllable NG10 and other digraph exemplars.

5,3: -es suffix (plurals and third-person singular, present tense forms) of previously introduced base words, e.g., boxes

Unit 3 introduces -es [ɪz] plurals and third-person singulars of base words. Exemplars are presently uncoded, but involve base words ending in -sh, -s, -ss, and -zz. The -es endings of -ch and -tch base words should be introduced in 11,2 where CH10 and TCH10 are sequenced for instruction. If too much confusion arises for the readers concerning the unstressed [ɪz] pronunciation of the -es

suffix, this unit could be postponed until after the unstressed E17 rule has been introduced in 10,1. The -s [s] and [z] endings of all previously taught base words have been allowed as soon after 1,3 as the base words themselves were introduced. Exception: The -ies endings of Y19 base words will be introduced in 11,2 with Y17 exemplars which also involve suffixed forms in which the y changes to i + es. The -s [s] or [z] plurals of VCe base words enter the sequence in 7,2.

5,4: -ed suffix (past tense) of previously introduced base words, e.g., stopped

Unit 4 introduces the -ed [d], [t], and [ɪd] past tenses and adjectives of base words. Exemplars are presently uncoded, but could be separated for the three pronunciations. If too much confusion arises for the readers concerning the unstressed [ɪd] pronunciations of the -ed suffix, these exemplars could be postponed until after E17 has been introduced in 10,1. The -ied endings of Y19 base words will be introduced in 10,2 with the -ied endings of Y17 base words. It would be optional to point out the silent e pronunciation in the -ed [d] and [t] exemplars. In speech, the correct pronunciation choice, [d], [t], or [ɪd], is made automatically.

E19: This rule applies when -ed or -es is a past tense or plural form (and not pronounced [əd] or [əz]), whether or not there is a simple verb or singular form (cf, Rule S31). Rule E19 has been used for coding purposes; in teaching, this should be considered a regular automatic phonological alternation (see Rule D10 and S10). Cf, Venezky (1970) and Vachek (1959).

5,5: NG10: ng → [ŋ], e.g., ring

Unit 5 introduces Rule NG10 in one-syllable exemplars. NG10 is included in Block 5 because its [ŋ] pronunciation was introduced in 5,2 for the -ing suffix. It is suggested that the first NG10 exemplars to be introduced be those in which the vowel is i (e.g., ring, sing, thing, wing) since the readers would already be familiar with the -ing correspondence.

As discussed in Block 2, the Rule NG10 could advisably be sequenced with the digraphs SH10, TH11, and TH13. The revision would be due to the allowance of -ing suffixes in Block 1 and to the fact that Rule NG10 itself is of high frequency, and its individual exemplars are too.

Block 6 (General primary vowel Rule 11)

Frequency = 259

Unit 1: E18, A11 (108), I11 (68)

Frequency = 176

Unit 2: O11 (60), U11 (16), E11 (3), EE10 + E18 (4)

Frequency = 83

Block 6 introduces general primary vowel Rule 11, the -VCe long vowel rule, which is the second most frequent type of vowel rule after the general primary vowel Rules 15 and 16, the short vowel rules. The -VCe rules are the first rules in the sequence whose environment specifies a particular letter (final, silent e). And these rules should be contrasted with the -VC(C) short vowel environmental characteristics. Rule 11 covering the silent final -e in -VCe words can also be contrasted with Rule E25 (3,1) covering the pronounced final e in one-vowel exemplars such as he.

The Vowel 11 rules are divided into Units 1 and 2 by frequency, with A11 being the most frequent, and E11 the least.

6,1: E18: $\underline{e} \rightarrow [\emptyset] / __\#, \text{ e.g., } \underline{\text{name}}, (\underline{\text{edge}})$

A11: $\underline{a} \rightarrow [e] / __\text{Ce}\#, \text{ e.g., } \underline{\text{name}}$

A11: $\underline{i} \rightarrow [ay] / __\text{Ce}\#, \text{ e.g., } \underline{\text{fine}}$

A11: Rule A11 generally is automatically pronounced $[\varepsilon]$ (or $[\æ]$ in some dialects) in an $/__\text{re}$ environment.

E18: Final \underline{e} is silent, except when part of a secondary vowel or when the only vowel in a word (see Rule E25).

Final silent \underline{e} performs a number of functions (see Jespersen, 1965, p. 193). Its primary use is as a marker of the long-vowel pronunciation in general primary vowel Rule 11. It also marks the pronunciation of \underline{c} , \underline{g} , and \underline{th} (see Rules C11, G11, and TH12). A final \underline{e} after \underline{s} in some words differentiates between a base form (e.g., $\underline{\text{dense}}$) and an inflected form (e.g., $\underline{\text{dens}}$). \underline{v} and \underline{u} generally do not occur finally, but are followed by an \underline{e} ; e.g., $\underline{\text{have}}, \underline{\text{continue}}$ (see general primary vowel Rule 38, and Rules U20, U26, and QU10). Sometimes final \underline{e} may have two functions, as in $\underline{\text{nice}}$ where it marks both the $\underline{i} \rightarrow [ay]$ (Rule 111) and the $\underline{c} \rightarrow [s]$ (Rule C11) correspondences.

6,2: O11: $\underline{o} \rightarrow [\text{ɔ}] / __\text{Ce}\#, \text{ e.g., } \underline{\text{home}}$

U11: $\underline{u} \rightarrow [(\text{y})u] / __\text{Ce}\#, \text{ e.g., } \underline{\text{cute}}, \underline{\text{crude}}$

E11: $\underline{e} \rightarrow [i] / __\text{Ce}\#, \text{ e.g., } \underline{\text{eve}}$

011: Rule 011 has the dialect variation [o], [ɔ], [a] in this same /__re environment.

U11: In regard to Rule U11, some of its exemplars are always pronounced [yu], some are always pronounced [u], and others can be pronounced either way. When following [r] or [l], it is always [u]; when following [t, d, s, z, ʃ, ʒ, ʧ, ʝ, n], it is generally [u], although there is some dialect variation. When following vowels or other consonants, it is generally [yu]; when word initial, it is always [yu]. The [yu] and [u] pronunciations are designated for the exemplars in the Word List in Section II of Volume II.

Block 7 (C11, G11; suffixes with general primary vowel Rule 11)

Frequency = 36

Unit 1: C11 (26), G11 (10)

Frequency = 36

Unit 2: -s, -d, and -ing suffixes added to words with primary vowel Rule 11

Block 7 introduces the alternative pronunciation of c and g. These rules state that c → [s] and g → [ʝ] when followed by e, i, or y. These correspondences require discrimination of an environment which may occur in various places in a word, and which specifies several alternate letter choices as determiners of the application of the rule. Thus, they are more complex than the -Vce (Vowel 11) rule, since they are not cued by as simple a condition as the final e of the long vowel exemplars. The C11 and G11 rules are sequenced to follow instruction on the Vowel 11 long vowel rules because C11 and G11 most often occur in the Vowel 11 -Vce environment, as -Vce and -Vge.

readers. Exemplars for these base words plus suffixes are presently uncoded although the base words themselves are coded and are sequenced for instruction in Blocks 6, 7, and subsequent blocks.

Block 8 (Two-syllable words, first syllable stressed)

Frequency = 70

Unit 1: Compounds with rules in Blocks 5-7 Frequency = 45

Unit 2: A16 (7), E16 (2), I16 (3), O16 (10), U16 (3) Frequency = 25

Block 8 is, in effect, a review block and a further step in the gradual introduction of two-syllable words.

8,1: Compounds with rules in Blocks 5-7, e.g., livestock

In Unit 1, all but two of the compounds, which involve rules from Blocks 5-7 (i.e., NG10, Vowel 11s, C11, G11), have Vowel 11 rules in them. For the compounds which have V11 correspondences at the beginning of the compound, it should be pointed out to the reader that it is because these exemplars are compounds that the e now in the middle of the word is still silent and not pronounced (e.g., firefly is pronounced [fáyrflay], not [féræfli] or [fayríflay]).

8,2: A16: a → [æ] / __CC..., e.g., accent

I16: i → [i] / __CC..., e.g., insect

U16: u → [ə] / __CC..., e.g., umpire

E16: e → [ɛ] / __CC..., e.g., reptile

O16: o → [o] / __CC..., e.g., costume

Unit 2 introduces general primary vowel Rule 16 in two-syllable words with the first syllable stressed. Rule 16s have the same short-vowel pronunciation in a / __CC... environment as Rule 15s,

taught in First Year, did in a /__C(C)# environment. This is the first instance in the sequence of two-syllable words other than compounds - base words plus suffixes. Only exemplars having the first syllable stressed are taught here so that readers will not have to consider stress as well as syllabification. Words with the second syllable stressed are not introduced until the end of Block 10, and could even be postponed until the end of this Second Year sequence.

U16: Unlike the other vowels, the vowel u has the same pronunciation [ə] before an r as it does before other consonants. The instruction on U16 /__r, however, seemed more appropriately placed with instruction on the Vowel 21s (/__Vr), so these exemplars were recoded as U21s and sequenced with the other Vowel 21s in Block 9.

Block 9 (Vowels before r)

Frequency = 322

Unit 1: one-syllable: A21 (40), O21 (26), U21 (15), I21 (14),
E21 (12) Frequency = 107

Unit 2: two syllables, first syllable stressed: E21 (150), U21 (5),
I21 (4), A21 (18), O21 (15) Frequency = 192

Unit 3: A25 (11), O22 (12) Frequency = 23

Block 9 introduces the next most frequent primary-vowel rule (after short and long vowels) in one-syllable words, the Vowel 21 rules. These rules cover the pronunciation of a vowel when followed by r. Since the ar rule (A21) is the most frequent of these rules, it comes first in the

sequence. It is followed by or (021), whose dialectical variations [o], [ɔ], and [a] should be acknowledged. The er, ir, and ur rules specify the same pronunciation, [ə] ([ər]), and are grouped together for this reason. These E21, I21, and U21 rules have the [ə] pronunciation whether they are stressed or unstressed. A21 and O21, however, while sharing this [ə] pronunciation when unstressed, do have different pronunciations when stressed. Thus, all -Vr correspondences (or -VrC, but not -Vre) are pronounced [ə] except for stressed ar and or.

E21, I21, U21, and all Vowel 17s followed by r, are pronounced as in -er, which can be written phonetically as [ər] in order to have a separate symbol for the vowel and consonant, or as [ə] since the sounds cannot be divided. In some dialects, the r following a vowel is not pronounced; in such a case, the phonetic representation of the -Vr would be [ə].

The -Vr rules are followed by A25 and O22, which are rules covering an exception to ar and or in which a different pronunciation occurs when ar or or are preceded by w. These war and wor rules also provide the first instance in the sequence of a correspondence with an environment specifying what precedes as well as what follows the rule-grapheme.

9.1: A21: a → [a] / __ {^{rC}_{r#}}, e.g., cart, car

O21: o → [o], [ɔ], [a] / __r, e.g., horn

U21: u → [ə] / __ {^{rC}_{r#}}, e.g., fur, burn

I21: i → [ə] / __ {^{rC}_{r#}}, e.g., bird, sir

E21: e → [ə] / __ {^{rC}_{r#}}, e.g., herd, her

Unit 1 introduces Vowel 21 rules in one-syllable words.

021: There is considerable variation in the pronunciation of or, but most individual speakers will use only one form for all pronunciations. However, in some dialects, -oar- and -our- (pronounced [o]) may differ from -or- (pronounced [ɔ]). Thus, for some speakers, hoarse contrasts with horse, and mourning contrasts with morning.

9,2: E21: e → [ə] / __ {^{rC}_{r#}}, e.g., western, father
(plus -er suffix with previously introduced words, e.g., banker.)

U21: u → [ə] / __ {^{rC}_{r#}}, e.g., sunburn, murmur

I21: i → [ə] / __ {^{rC}_{r#}}, e.g., birdseed

A21: a → [ə] / __ {^{rC}_{r#}}, e.g., farmer, streetcar

O21: o → [o], [ɔ], [a] / __ {^{rC}_{r#}}, e.g., order, popcorn

Unit 2 introduces the Vowel 21 rules in two-syllable words having the first syllable stressed.

E21: E21 is taught first in Unit 2 because it has far more exemplars than any of the other Vowel 21 rules. The unstressed forms of -er are allowed both because of their high frequency and because their pronunciation [ə], is the same as for stressed E21, taught in Unit 1.

Instruction on E21 in Unit 2 commences with the -er agent noun forms and comparative adjective forms of base words, including those in which the final consonant is doubled before the -er. Agent and

comparative forms of other previously taught words (including words with Vowel Rule 11) can also be taught here.

In most dialects, base words ending in ng retain their regular NG10 pronunciation, [ŋ], when the -er agent form suffix is added, but change to a [ŋg] pronunciation for the -er comparative form; e.g., singer, vs. stronger.

I21 & U21: I21 and U21 also have the same pronunciation, [ə], when stressed or unstressed but there are no lexicon exemplars of unstressed ir, and the only exemplars of unstressed ur (auburn, sulphur, suburb, surprise) cannot enter the sequence here due to their having other components which have not yet been taught.

A21 & O21: Unstressed ar and or receive instruction in 10,1 with other unstressed vowels rather than here, since their unstressed pronunciations, involving schwa, do differ from their stressed pronunciations.

9,3: A25: a → [o] / {^{wh}_w } r, e.g., (wharf), war, (quart)

O22: o → [ə] / wrc, e.g., word, worth

Rules A25 and O22 are introduced in Unit 3. Both share the /wrc environment, but A25 also occurs in the environment:

/ {^w_{wh} } r {[#]_c }.

A25: The /wh__r and /qu__r exemplars of A25 enter the sequence in Block 11, Units 3 and 4, with WH10 and QU10, respectively. Thus, only the /w__r {[#]_C} environments need be taught here. A25 has a dialect variation of [o] and [ɔ] which should be acknowledged if necessary. The only exception to A25 is -ward when it is an unstressed syllable (i.e., awkward, forward), in which case the pronunciation of the ar is [ə], just as it is for any other unstressed -Vr.

022: 022 occurs in a /w__rC environment (e.g., work). The only exception to 022 is the word worn (derived from wore, which is regular by Rule 011 or 021).

Block 10 (Unstressed vowels; Two-syllable words with second syllable stressed)

Frequency = 575

Unit 1: General primary vowel Rule 17, first syllable stressed:
I17 (36), U17 (6), E17 (89), A17 (45), O17 (37)

Frequency = 213

Unit 2: Y17 (142), LE22 (84)

Frequency = 226

Unit 3: Compounds, second syllable stressed

Frequency = 8

Unit 4: Two-syllable words, second syllable stressed: I16 (14),
U16 (5), A16 (4), O16 (2), E21 (4), O21 (2), EE10 (9)

Frequency = 40

Unit 5: General primary vowel Rule 17, two-syllable words, second syllable stressed: A17 (39), E17 (19), O17 (31), U17 (5),
I17 (2)

Frequency = 88

Block 10 introduces the unstressed ([ə] or [ɪ]) pronunciation of unstressed vowels. Not all unstressed vowels are reduced to a [ə] or [ɪ] pronunciation, and for any one speaker, a given vowel when reduced

may be pronounced [ə] in one word and [ɪ] in another word (e.g., for some speakers, the u in circus would be pronounced [ɪ], while the u in album would be pronounced [ə]). Beginning readers often have difficulty with the unstressed vowel concept because when they are first learning to decode words, they tend to give a stressed pronunciation to all the graphemes. This problem, however, will probably be largely overcome as the readers learn about syllabification and stress.

If syllabification is taught at all, it should be flexible so that readers are not forced, for example, to divide the word mistake into mis-take rather than what for them might be more natural: mi-stake. In regard to stress patterns, readers would benefit from the information that there are many times more words with the first syllable stressed than with the second syllable stressed. In the SWRL lexicon, the ratio is 4:1 for two-syllable words, and 2:1 for three-syllable words. Four-syllable words have more complex stress patterns.

10,1: (First syllable stressed)

I17: i → [ə], [ɪ] in unstressed syllables, e.g., pilgrim,
furnish

U17: u → [ə], [ɪ] in unstressed syllables, e.g., album,
campus

E17: e → [ə], [ɪ] in unstressed syllables, e.g., tunnel,
hidden

A17: a → [ə], [ɪ] in unstressed syllables, e.g., final,
canvas

O17: o → [ə], [ɪ] in unstressed syllables, e.g., cotton,
actor

Unit 1 commences with the rules I17 and U17 because the unstressed pronunciation of each is usually the same as its short

pronunciation ([ɪ] and [ə], respectively). Rules E17, A17, and O17 are then sequenced by frequency.

E17: Superlatives (-est) of base words are uncoded in the lexicon but should be taught with E17, perhaps as the first exemplars of this rule. For the suffixes -less, -ness, -en, and -ed, allow these forms of any previously taught base words, as well as the lexical exemplars.

A17 & O17: A17 and O17 exemplars should be separated for those which occur in the environment / r {[#]_C} because ar and or change from Rules A21 and O21 pronunciations (A21: [a]; O21: [o], [ɔ], [ə]) to A17 and O17 pronunciations ([ə]) when unstressed. E17, I17, and U17 / r {[#]_C}, on the other hand, have the same [ə] pronunciation as E21, I21, and U21.

U17: This rule was used only with words in which [ə] could not be indicated by using Rules U15 and U16, when u appeared in an unstressed syllable.

10,2: Y17: y → [ɪ], [ɪ] / # in unstressed syllables, e.g., candy

LE22: le → [əl] /C #, e.g., little, stable

The rules Y17 and LE22 are included in Block 10 with unstressed vowels because they are always unstressed. These two rules occur at the end of the second syllable in words having the first syllable stressed. All their exemplars occur in the environment /...C #.

LE22: The grapheme unit, le, is invariantly pronounced [əl] as in LE22 when in the environment /...C # (cf, L10, E18: le → [ɪ] /V #: e.g., pale, style).

Y17: The pronunciation of Y17, unstressed y in word-final position, has the dialect variation [i] or [ɪ]. In isolation [i] is more common, but unstressed [ɪ] (cf, general primary vowel Rule 17) is often used in connected speech. *Webster's Seventh New Collegiate Dictionary* (1967) uses [i]; *Webster's New World Dictionary* (1957), and Kenyon and Knott (1953, p. 481) use [ɪ] but acknowledge the [i] pronunciation.

Y17 primarily occurs in -ly adverbial endings and -y adjectival endings of base words. The rule is productive and uncomplex allowing for additional practice on previously introduced rules contained in its exemplars.

For both Y17 and Y19, stressed y in word-final position, the y remains y / __ing. Y17 also occurs, and remains y, before other suffixes beginning with the letter i (e.g., ish, ist). Before suffixes not beginning with the letter i, however, in both Y17 and Y19 the y changes to i. For Y19, y → i / __^{ed}_{es}, and the i retains the [ay] pronunciation of the y in the Y19 base words. For Y17, too, the y → i / __^{ed}_{es}, and for these exemplars, the i retains the [i] pronunciation of the y in the Y17 base words. Y17 also occurs, and changes to i, before other suffixes not beginning with the letter i (e.g., -er, -est, -less, -ly, -ment, -ness).

10,3: Compounds (second syllable stressed), e.g., herself

Units 3-5 introduce two-syllable words having the second syllable stressed. Heretofore in the sequence, the two-syllable words taught have had the first syllable stressed. In these units of Block 10, some exemplars with the second syllable stressed are introduced, thus providing the contrast necessary for identifying the concept of stress. The first exemplars with the second syllable stressed are compounds, presented in Unit 3. These lexical compounds are composed of all previously taught rules. Nonlexicon compounds of other previously taught basewords are also allowed.

10,4: (Second syllable stressed)

I16: i → [ɪ] / __CC..., e.g., inform

U16: u → [ə] / __CC..., e.g., unless

A16: a → [æ] / __CC..., e.g., accept

O16: o → [a] / __CC..., e.g., trombone

E21: e → [ə] / __^{rc}_{r#}, e.g., perhaps

O21: o → [o], [ɔ], [a] / __r, e.g., cornet

EE10: ee → [i], e.g., indeed

Unit 4 introduces noncompound two-syllable words with the second syllable stressed, utilizing all previously taught rules except vowel Rule 17, that could have such exemplars at this point in the sequence. Many of the exemplars involve prefixes such as in-, dis-, un-.

10,5: (Second syllable stressed)

A17: a → [ə], [ɪ] in unstressed syllables, e.g., alike

E17: e → [ə], [ɪ] in unstressed syllables, e.g., except

O17: o → [ə], [ɪ] in unstressed syllables, e.g., connect

U17: u → [ə], [ɪ] in unstressed syllables, e.g., subtract

I17: i → [ə], [ɪ] in unstressed syllables, e.g., divide

Unit 5 introduces Vowel 17 exemplars which are two-syllable words having the second syllable stressed. Most of these exemplars also involve prefixes, such as a-, ex-, con-, pro-.

Block 11 (Consonant digraphs; GG10, CC12, G31)

Frequency = 214

Unit 1: NG10

Frequency = 41

Unit 2: CH10 (60), TCH10 (36)

Frequency = 97

Unit 3: WH10

Frequency = 23

Unit 4: QU10

Frequency = 24

Unit 5: GG10 (17), CC12 (2)

Frequency = 19

Unit 6: G31

Frequency = 10

Block 11 introduces the rules for the common digraphs ch, wh, and qu. Also covered are the nonverb form exemplars of NG10, the geminates GG10 and CC12, and G31, a common exception to G11.

11,1: NG10: ng → [ŋ] / __#, e.g., ring

Unit 1 introduces NG10's -ing noun and adjective forms of base words. All of these exemplars can also be verbs and so could be sequenced in 5,2 with the uncoded -ing verb forms of base words (or in Block 2 if NG10 and -ing suffixes are moved up in the

sequence). NG10 also has final -ing exemplars which are not verb, noun, or adjective forms of base words (e.g., cunning, darling). These too, are sequenced here, but if the noun and adjective forms are moved up in the sequence, these could be as well. The grapheme has other pronunciations besides [ŋ]. These pronunciations and their corresponding rule combinations are: ng → [ŋg]: N20, G12; ng → [ŋ]: N20, G31; and ng → [ŋʃ]: M10, G11. It is suggested that these correspondences be introduced here in 11,1 as a contrast to NG10's two-syllable exemplars, or in Third Year if the decision is made to sequence all of NG10's exemplars in Block 5 (or Block 2).

11,2: CH10: ch → [ʃ], e.g., church

TCH10: tch → [ʃ], e.g., match

The rules CH10 and TCH10 are sequenced together in Unit 2 because of their shared pronunciation, [ʃ], and complementary distributions. CH10 occurs primarily in word-initial position and following a consonant or secondary vowel in word-final position (i.e., /#_ and /...C_#). TCH10, on the other hand, does not occur initially, and it primarily occurs following a short vowel in word-final position (i.e., /...V_#). The es → [ɪz] plurals of base words ending in ch and tch should be sequenced in this unit.

TCH10: The grapheme tch is invariantly pronounced [ʃ] as in TCH10.

11,3: WH10: wh → [hw] or [w], e.g., when

Unit 3 introduces WH10, which has the dialect variation: [w] or [hw]. The grapheme unit wh has only two pronunciations: [w] (or [hw] in some dialects) as in WH10 and [h] as in WH40.

11,4. QU10: qu → [kw], e.g., quick

Rule QU10 is introduced in Unit 4. The letters qu are considered a grapheme unit because, in English words, the letter q is always followed by u. The grapheme unit qu has only two pronunciations: [kw] as in QU10, and [k] as in QU40. The exemplars for Rule A25, itself sequenced in 9,3, which occur in the environments /wh__r and /qu__r, should be introduced in Block 11's Unit 3 and Unit 4 respectively. The remaining digraph rules, GH10, which is silent, and PH10, CH31, and TH12, which are all low-frequency correspondences, are sequenced in Third Year.

11,5: GG10: gg → [g], e.g., egg, wiggle

CC12: cc → $\begin{Bmatrix} a \\ o \\ u \end{Bmatrix}$, e.g., yucca, accord, hiccup

The geminate consonant rules GG10 and CC12 are sequenced in 11,5 rather than in Block 4, Units 2 and 3, with C12 and G12 because all of their exemplars (except egg) occur in two-syllable words and most of these exemplars include rules introduced in Block 10.

GG10: The grapheme gg is invariantly pronounced [g] as in GG10, except in the word suggest.

CC12: The grapheme cc has two pronunciations: [k] as in CC12, and [ks] as in CC11, which is sequenced in Third Year. Both of these rules have so few exemplars (CC12: 9, and only two of these can enter the sequence here; CC11: 4) that it would be advisable to postpone instruction on CC12 until 20,4, where CC11 and the other lowest frequency consonants are sequenced.

11,6: G31: $\underset{1}{g} \rightarrow [g]$, e.g., get, girl

If CC12 is deleted from Block 11, then Rule G31, sequenced in Unit 6, could be moved up into Unit 5 with GG10. Both have a [g] pronunciation. G31 is an exception to Rule G11, which has the same $/_\{\begin{smallmatrix} e \\ i \\ y \end{smallmatrix}\}/$ environment. As an alternative to sequencing G31 here in Block 11, Unit 5 or 6, its one-syllable exemplars could be taught either with Rule G12 ($\underset{1}{g} \rightarrow [g]$) in 4,3, or as exceptions to Rule G11 in 7,1 (although there would only be four exemplars at either point). The two-syllable -nger exemplars of G31 could then be introduced in Block 11 or Third Year with the N20, G12 and N10, G11 contrasts to Rule NG10.

Block 12 (High-frequency secondary vowels)

Frequency = 478

Unit 1: AY10	Frequency = 49
Unit 2: EA11 (142), EA31 (42)	Frequency = 184
Unit 3: OU12 (89), OO11 (54)	Frequency = 143
Unit 4: OW11 (60), OW12 (43)	Frequency = 102

The only secondary vowel rule to have entered the sequence before Block 12 is Rule EE10, which was introduced in First Year, Block 3, because of its high rule frequency and its high individual exemplar frequencies. Also, as a geminate vowel rule having the same pronunciation as its individual letters' name ([iy], e), EE10 is considered to be instructionally uncomplex. The other secondary vowel rules have been divided into three groupings according to the combined considerations of frequency, contrasting homographs (i.e., same grapheme, but different

phoneme), and homophones (i.e., same phoneme, but different grapheme). a number of which are in complementary distribution.

The first group of secondary vowels, introduced here, have high rule frequencies and high individual exemplar frequencies. Three of the rules have contrasting homograph correspondences presented with them. The second group of secondary vowels, introduced in Block 16 of Third Year, have medium frequencies (with the exception of high-frequency AY10 and OU10, which could be resequenced into Second Year) and are subgrouped by homophones with complementary distributions. The third group of secondary vowels, introduced in Block 26 of Fourth Year, have low rule frequencies.

The contrasting correspondences for the grapheme units ea, oo, and ow are sequenced as units because each correspondence has a high rule frequency and/or high individual exemplar frequencies and because none has specifiable environmental constraints which are simple enough for the younger reader to remember. If it is found that, in these instances, it is not practical to teach the readers alternate pronunciations simultaneously, then, of course, the contrasting correspondences could be sequenced in a later block.

12,1: AY10: ay → [e], e.g., day

Block 12's introduction of secondary vowels commences with Rule AY10 because of that rule's regularity and its high individual exemplar frequencies. The grapheme unit ay is invariantly pronounced [e] as in AY10, except for aye and says (although, in unstressed syllables, ay may be pronounced [i] or [ɪ], e.g., Sunday).

If the learning load will allow, it is suggested that Rule A110 be sequenced here with AY10 rather than in Third Year, as at present. As well as having a high rule frequency, Rule A110 has the same pronunciation as, and is in complementary distribution with AY10. The letters i and y, and u and w, are in complementary distribution in several secondary vowels: ai/ay; au/aw; ei/ey; eu/ew; oi/oy; and ou/ow. In general, y and w are found in word-final position and i and u elsewhere (e.g., day/daily; coy/coil), although this pattern does not always hold. Secondary vowels, in fact, are generally limited in their distribution; e.g., several of them do not occur initially.

12,2: EA11: ea → [i], e.g., each

EA31: ea → [ɛ], e.g., bread

Unit 2 introduces the contrasting rules EA11 (ea → [i]) and EA31 (ea → [ɛ]). EA11 and EA31 share most of their environments, so it is very difficult to give readers a basis for determining the correct pronunciation of the grapheme ea, except that EA11 does have three times more exemplars than EA31. Some homographs with ea can be distinguished only by their grammatical function, e.g., lead. EA11 and EA31 sometimes alternate for present and past tenses, e.g., read/read, mean/meant.

EA11: The following environments apply to EA11, but not

EA31:

/ — {

c
ch...
g...
l
m
p
sh
}

Other environments which apply to EA11, but not EA31, are:

$/_ \left\{ \begin{array}{l} \text{se} \\ \text{son} \\ \text{sy} \\ \text{tuer\#} \\ \text{the\#} \end{array} \right\} /$. These will be introduced in Third Year, where their

component rules (e.g., S20) are sequenced.

EA31: The environment $/_lth$ applies to EA31, but not to

EA11. The environments $/_ \left\{ \begin{array}{l} \text{sant\#} \\ \text{sure\#} \\ \text{ther\#} \end{array} \right\} /$ also apply to

EA31, but not to EA11. They will be introduced in

Third Year. Other environments, e.g., $/_ \left\{ \begin{array}{l} \text{d} \\ \text{f} \\ \text{r} \end{array} \right\} /$ apply

both to EA11 and EA31.

12,3: 0011: $\underline{oo} \rightarrow [u]$, e.g., broom

0012: $\underline{oo} \rightarrow [u]$, e.g., book)

Unit 3 introduces the rules 0011 ($\underline{oo} \rightarrow [u]$) and 0012 ($\underline{oo} \rightarrow [u]$).

The following environments apply to 0011, but not to 0012:

$\left\{ \begin{array}{l} \# \\ \text{n} \\ \text{m} \\ \text{p} \\ \text{st} \\ \text{th} \end{array} \right\}$

The environments $/_ \left\{ \begin{array}{l} \text{h} \\ \text{se} \end{array} \right\} /$ also apply to 0011, but not to 0012. They

will be introduced in Third Year. There is no environment that

applies only to 0012 and not to 0011, although the environment $/_k$

applies primarily to 0012.

12,4: 0W11: $\underline{ow} \rightarrow [o]$, e.g., below, own

0W12: $\underline{ow} \rightarrow [aw]$, e.g., allow, owl

Unit 4 introduces the rules 0W11 ($\underline{ow} \rightarrow [o]$) and 0W12 ($\underline{ow} \rightarrow [aw]$).

The grapheme unit ow has only two pronunciations: $[o]$ as in 0W11,

and $[aw]$ as in 0W12, except for the word knowledge. Also, in some

dialects, an unstressed 0W11 is pronounced $[\partial]$.

The primary environment for OW11 is /__#, particularly at the end of two-syllable words, but a number of OW12 words have the /__# environment in one-syllable words. There are no other specifiable environments to distinguish the use of [o] or [aw] for the grapheme unit ow.

Because of its high frequency and its being in complementary distribution with OW12 (ow → [aw]), Rule OU10 (ou → [aw]) would be more appropriately sequenced, following OW12, as Unit 5 of this Block 12 rather than as it is now in Third Year with the medium-frequency secondary vowels.

Block 13 (Additional common primary vowel rules)

Frequency = 197

Unit 1: 031 (38), U31 (35) Frequency = 73

Unit 2: A23 (26), 023 (26) Frequency = 52

Unit 3: 122 (21), 024 (51) Frequency = 72

Block 13 introduces some additional rules for primary vowels.

Teaching these rules, rather than just teaching as sight words the high-frequency words containing these rules, not only allows the introduction of additional lower frequency words, but continues the emphasis on the nearly comprehensive pronunciation predictability of English words. Instruction will be based on specifiable environments, when this is a rule characteristic. When not, the exemplars will be taught as groups of words, each group manifesting an exception to previously learned rules. The rules vary in predictability from the highly predictable Rule A23 to the unpredictable 031.

13,1: 031: $\underline{o} \rightarrow [ə]$, e.g., won, love

U31: $\underline{u} \rightarrow [u]$, e.g., bull, push

Unit 1 introduces the common vowel rule exceptions, Rules 031 ($\underline{o} \rightarrow [ə]$) and U31 ($\underline{u} \rightarrow [u]$).

031: Rule 031 occurs in stressed syllables where other pronunciations would be expected. In fact, there are no 031 environments which do not also apply to other o rules. Rule 031 generally occurs in the following

environments: $/ _ \left\{ \begin{matrix} n \\ m \\ th \\ v \end{matrix} \right\}$

U31: Rule U31 occurs primarily in the suffix, -ful, as well as in the word full and compounds of it. Otherwise, its environments are generally $/ \left\{ \begin{matrix} b \\ p \end{matrix} \right\} _ \left\{ \begin{matrix} l \\ sh \end{matrix} \right\}$.

No other rules for the grapheme u (e.g., U15, U16, U17) have these environments.

13,2: A23: $\underline{a} \rightarrow [ɔ]$ $/ _ \left\{ \begin{matrix} l \\ k \\ t \\ d \end{matrix} \right\}$, e.g., ball, walk, salt, bald

023: $\underline{o} \rightarrow [o]$ $/ _ l\#$, e.g., roll, yolk

Unit 2 introduces Rules A23 ($\underline{a} \rightarrow [ɔ]$) and 023 ($\underline{o} \rightarrow [o]$), both of which occur in the environments $/ _ \left\{ \begin{matrix} l \\ k \\ t \\ d \end{matrix} \right\}$. Rules A23 and 023 also occur in the environment $/ _ lk$, but these exemplars, due to the silent l, will be introduced in Third Year.

023: Rule 023 applies in the environment $/ _ l\#$ in stressed syllables. The only lexical exemplars are control and patrol, which are presently coded as exceptions, but which could be sequenced in this unit.

13,3: 122: $\underline{i} \rightarrow [\text{ay}] / _ \left\{ \begin{smallmatrix} \text{nd} \\ \text{ld} \end{smallmatrix} \right\} \#$, e.g., find, wild, sing

024: $\underline{o} \rightarrow [\text{ɔ}]$ or $[\text{a}] / _ \left\{ \begin{smallmatrix} \text{fC} \\ \text{g\#} \\ \text{ng} \\ \text{nk} \end{smallmatrix} \right\}$, e.g., soft, dog, song, honk

Unit 3 introduces Rules 122 ($\underline{i} \rightarrow [\text{ay}]$) and 024 ($\underline{o} \rightarrow [\text{ɔ}]$ or $[\text{a}]$).

122: Rule 122 occurs in the environments $/ _ \left\{ \begin{smallmatrix} \text{nd\#} \\ \text{ld\#} \end{smallmatrix} \right\}$. 122 also occurs in the environment $/ _ \text{gn\#}$. These exemplars, due to the silent g (Rule G20), are sequenced in 19,3 of Third Year with the introduction of silent letters.

024: Rule 024 has the dialect variation $[\text{ɔ}]$ or $[\text{a}]$ and occurs in the environments $/ _ \left\{ \begin{smallmatrix} \text{fC} \\ \text{g\#} \\ \text{ng} \\ \text{nk} \end{smallmatrix} \right\}$. These environments apply to Rule 024, but not to any other o rules. The words on and onto, coded as "016...P" (i.e., $\underline{o} \rightarrow [\text{a}]$, with other pronunciations recognized), also have this $[\text{ɔ}]$ and $[\text{a}]$ dialect variation. The following environments apply to Rule 024, but also to other o rules: $/ _ \left\{ \begin{smallmatrix} \text{ss} \\ \text{st} \\ \text{th} \end{smallmatrix} \right\}$. The environment $/ _ \text{st}$ will be deleted from future versions of this rule since there are nearly as many exceptions (pronounced $[\text{ɔ}]$) as exemplars (cf, lost and most).

In dialects where $[\text{a}]$ and $[\text{ɔ}]$ contrast, the occurrences of these sounds "is highly erratic, varying not only regionally, but also from word to word" (Kurath, 1964, p. 112). This affects the following rules in particular: 024, 021, and A24.

Block 14 (Nonlong vowels in -VC(C)e words)

Frequency = 80

Unit 1: Vowel 16s in Stressed -VCCe# Frequency = 35

Unit 2: Vowel 21s in Stressed -VrCe# Frequency = 18

Unit 3: Vowel 17s in Unstressed -VCCe# and -VCe# Frequency = 27

Block 14 introduces the short vowel pronunciations in the environment -VCCe, which is similar to both the previously specified short vowel (-VCC{[#]_V}) and long vowel (-VCe) rules. In the case of -VCCe exemplars, however, the final silent e does not mark a long vowel pronunciation, but rather the e marks a morphemic boundary and/or the pronunciation of the final consonant. In nearly all of the exemplars in this block, the final consonant is c, g, s, or v. Without the following e, the graphemes c and g would be pronounced [k] and [g] rather than [s] and [j] (e.g., compare the nonword sinc with since, and urg with urge). Without the marker e, an s might be pronounced [z] or appear to be a plural (e.g., dens vs. dense). And final y does not occur in English (e.g., twelv would be a nonword).

14,1: stressed VCCe#, e.g., dance

In Unit 1, the specific consonants in the -VCCe environments of these short vowels are: -dge, -nge, (-nce, -nse), and -lce (-ive, -lce, -lge). Examples are, badge, dance, and shelve.

14,2: stressed VrCe#, e.g., nurse

In Unit 2, the consonants in the -VrCe environments of these vowel 21s (vowels followed by r) are: -rse (e.g., curse), -rve (e.g., carve), and -rge (e.g., charge).

14,3: unstressed VCCe# and VCe#, e.g., absence

In Unit 3, the consonants in the unstressed -VCCe and -VCe environments of the Vowel 17s (unstressed vowels) are: -nce (e.g., absence), -Vge (e.g., bandage), and -Vce (e.g., furnace).

If program developers find that the readers are too confused by the nonlong vowel pronunciations in -VCCe exemplars, as opposed to the regular long vowels in -VCe environments, then the correspondences and exemplars in Block 14 could be postponed until Third Year. Otherwise, as sequenced here, Block 14 would be the final instructional segment in Second Year.

Third Year

(8-9 age-level words; three-syllable words; Medium-frequency primary and secondary vowels; Low-frequency consonants; Silent letters; Major palatalizations; Affixes; Three-syllable stress patterns)

Frequency = 3213

Block 15 (Review, employing 8-9 words covered by First- and Second-Year rules)

Frequency = 904

Unit 1: 8-9 one-syllable words with First Year rules Frequency = 84

Unit 2: 8-9 words with Second Year rules Frequency = 820

Block 15 is a review block, employing all 8-9 age-level words covered by First and Second Year rules. It provides an opportunity for expanding reading vocabulary by adding more rule-based words known by the child.

15,1: 8-9 one-syllable words with First Year rules

15,2: 8-9 words with Second Year rules

This unit provides for the systematic review of Second Year correspondences. Since age-grading of the present lexicon is not completely accurate, some of these words could be added to the Second Year word list if desired. The words in this unit might also be used for Second Year word-attack study.

Block 16 (Secondary vowels of medium frequency)

Frequency = 488

Unit 1: AIIO

Frequency = 135

Unit 2: OUIO

Frequency = 98

Unit 3: OEIO (7), OAIO (82)

Frequency = 89

Unit 4: AW10 (44), AU10 (17)	Frequency = 61
Unit 5: OI10 (26), OY10 (22)	Frequency = 48
Unit 6: UE10 (20), UI10 (7), EW10 (30)	Frequency = 57

Block 16 introduces secondary vowels of medium frequency. High-frequency secondary vowels are introduced in Second Year (Block 12); low-frequency ones are introduced in Fourth Year (Block 26). If desired it would be possible to move some of the correspondences in Block 16 to one of the other blocks of secondary vowels.

16,1: AI10: ai → [e], e.g., pain

The secondary vowel ai occurs initially and medially and is in complementary distribution with ay, which occurs finally (AY10; 12,1). In some words, ay changes to ai when a suffix is added, e.g., day, daily (cf, -ly, 17,3). For ai in unstressed syllables, see Rule AI17 (26,3). Major exceptions to Rules AI10 and AI17 are said and again, both with [ɪ].

16,2: OU10: ou → [aʊ], e.g., found

Rule OU10 occurs initially and medially, and is in complementary distribution with Rule OW12 (12,4), which generally occurs finally. There are four other minor pronunciations for ou (introduced in Block 26), although they occur in several high-frequency words.

16,3: OE10: oe → [o] / __', e.g., toe

OA10: oa → [o], e.g., boat

Both secondary vowels in this unit are pronounced [o]. OE10 comes first because of its similarity to OI1 (6,2) with oCe.

OE10: Medial oe is generally a combination of o and e, e.g., poet (see Rule 026, 25,2). The major exception to Rule OE10 is the word shoe and its derivatives.

OA10: The major exception to this rule is the word broad and its derivatives.

16,4: AW10: aw → [ɔ], e.g., law

AU10: au → [ɔ], e.g., cause

These two secondary vowels are in complementary distribution, aw generally occurring finally and au occurring initially and medially. The pronunciation of these secondary vowels is [ɔ], or for some dialects and speakers, [a] (e.g., Rule 015); thus dawn and Don may not contrast.

AW10: This rule is invariant, with no exceptions.

AU10: This rule is nearly invariant, with only a few exceptions, notably laugh and aunt.

16,5: OI10: oi → [oy], e.g., coin

OY10: oy → [oy], e.g., boy

These two secondary vowels are in complementary distribution, oy generally occurring finally and oi occurring initially and medially. Both rules are nearly invariant, with rather minor exceptions.

16,6: UE10: ue → [(y)u], e.g., due, hue

UI10: ui → [(y)u], e.g., fruit

EW10: ew → [(y)u], e.g., few

All three secondary vowels in this unit have the same pronunciation, [(y)u]; see 6,2 for comments on the pronunciation of the "long-u" sound.

UE10: The spelling ue is considered to be pronounced [(y)u], although it may often be disyllabic ([(y)uəl]), e.g., fuel (cf, Rule U26; 25,2). All exceptions to this rule are cases of silent final ue after g; i.e., ue → Ø /g__#; e.g., league.

UI10: All exceptions to this rule are pronounced [ɪ], e.g., build, and are classified under Rule U31 (26,8).

EW10: The secondary vowel ew generally occurs finally and is in complementary distribution with eu, which occurs initially and medially. Because of low frequency, a correspondence for eu was not included in the present rule set. However, it is as follows: eu → [(y)u], e.g., feud, Eugene. Rule EW10 is nearly invariant, with the primary exception being sew and its derivatives.

Block 17 (Suffixed and compound three-syllable words, Suffixes)

Freq. y = 402

Unit 1: Three-syllable compounds Frequency = 123

Unit 2: Two-syllable words with suffixes:
-er (45), -en (9), -ing (16), -y (14),
-s (49), -ed (29) Frequency = 162

Unit 3: Three-syllable words with suffixes:
-er (48), -en (3), -ing (12), -ed (6),
-ly (48) Frequency = 117

17,1: Three-syllable compounds

This unit marks the first appearance of three-syllable words. The gradual introduction of three-syllable words continues in the first unit of each block until Block 22, where they are thoroughly taught.

At this point and hereafter, it is possible to add three-syllable compounds formed by combining previously taught one- and two-syllable words.

17,2: Two-syllable words with suffixes: -er, -en, -ing, -y, -s, -ed

These suffixes have been allowed previously and this unit is a "clean-up" operation. Many of the words have a final silent e in their base form; in their suffixed form, the first (long) vowel in the words could also be described by general primary vowel Rule 13 (18,1).

Words coded with Rules E19 and S31 have been included in this unit. These rules were used for coding purposes and need not be explicitly taught, since they are not spelling-to-sound correspondences, but automatic morphological changes.

-s Most of the words in this unit ending in -s are (1) not plurals, e.g., hers, (2) plurals with no base form, e.g., suds, (3) plurals with a base form not a noun, e.g., blinds, or (4) plurals with a different meaning from the noun base form, e.g., glasses. In addition, in this unit most exemplars of the ending are pronounced [z].

-ed: Most of the words in this unit ending in -ed are past participles commonly used as adjectives (e.g., mashed), sometimes without a base form, (e.g., ashamed) or with a base form not a verb (e.g., famed).

17,3: Three-syllable words with suffixes: -er, -en, -ing, -ed, -ly

Some of the words in this unit are compounds which do not exist as a compound base form without the suffix; e.g., nutcracker is not formed from nutcrack. Rather, these words are compounds of a base word plus a suffixed word, e.g., nut + cracker.

At this point and hereafter, the suffixes from this unit plus -(e)s may be added to any two-syllable word to form a three-syllable word.

-ed: In this unit, all examples of -ed are pronounced [əd] and form adjectives.

-ly: There is generally no change in a base word when -ly is added. However, if the base ends in unstressed y (Y17: [i]), the y changes to i (I17: [i] or [ə]) when -ly is added, e.g., happily. The suffixed form -fully (e.g., cheerfully) is sometimes pronounced as one syllable [fli].

Block 18 (Primary-vowel and single-consonant rules of medium frequency)

Frequency = 512

Unit 1: E13 (121), O13 (72), A13 (43), I13 (39),
U13 (29)

Frequency = 304

Unit 2: S20 (94), S21 (56)

Frequency = 151

Unit 3: A22

Frequency = 29

Unit 4: 025

Frequency = 28

Block 18 introduces additional primary vowel rules of medium frequency, as well as the remaining correspondences for s. The rules in this block primarily involve multisyllable words.

18,1: E13: e → [i] / __CV, e.g., cedar

O13: o → [o] / __CV, e.g., open

A13: a → [e] / __CV, e.g., baby

I13: i → [ay] / __CV, e.g., final

U13: u → [(y)u] / __CV, e.g., duty

In this unit, general primary vowel Rule 13 is introduced:

$V \rightarrow [\check{V}] / \text{__CV}$. This is related to general primary vowel Rule 11 (the "V-check" rule: $V \rightarrow [\check{V}] / \text{__Ce\#}$; Block 5), but with the environment extended to all vowels after a single consonant and to e when not in final position. There are many exceptions ($V \rightarrow [\check{V}] / \text{__CV}$) to Rule 13, which is one of the least reliable among the present set of correspondences. Some exceptions are covered by general primary vowel Rules 27, 28, and 38 (Block 24).

While there is no adequate solution for handling exceptions to Rule 13 in terms of spelling-to-sound correspondences, an instructional solution can be suggested: teach children to have a set for diversity (cf, Levin & Watson, 1963a, b; Williams, 1968) when encountering vowels in the environment /__CV (where C ≠ r, which requires Vr rules). The decoding strategy is as follows:

1. try a long-vowel pronunciation (Rule 13);

2. if (1) does not produce a known word, try a short-vowel pronunciation.

The third step is a more general one which must be used in decoding words of more than one syllable.

3. if (1) and (2) do not produce a known word, try a schwa [ə] pronunciation (a vowel Rule 17 pronunciation).

To develop the above strategy, it is suggested that, after Rule 13 is taught, exceptions be introduced, perhaps as exemplars of an exception rule. Exceptions to general primary vowel Rule 13 can be found among the irregularly-spelled ds (Volume II, Section III), indicated as follows:

$V \rightarrow [\check{V}] / __\text{CV}$

or: $\underline{a} \rightarrow [\text{æ}] / __\text{CV}$

$\underline{e} \rightarrow [\text{ɛ}] / __\text{CV}$

$\underline{i} \rightarrow [\text{ɪ}] / __\text{CV}$

$\underline{o} \rightarrow [\text{a}] / __\text{CV}$

$\underline{u} \rightarrow [\text{ə}] / __\text{CV}$

E13: Many exemplars of this rule involve the prefix re- (e.g., repay) or the pseudo-prefixes be-, de-, pre-, and re-; the e in these unstressed syllables is often pronounced [ɪ] or [ə]. (If Rule E11 is not taught in Second Year, this would be an appropriate place to teach it.)

O13: A few of the exemplars of this rule involve the pseudo-prefix pro-. In unstressed syllables the o may be pronounced [ə].

A13: See Rule A22 (18,3) for a in the environment /__rV.

U13: See 6,2 for comments on the pronunciation of [(y)u].

In some words, U13 in the environment /__r may be pronounced [(y)ə], e.g., jury.

18,2: S20: s → [z] / V__V, e.g., nose

S21: s → [s] / $\left\{ \begin{array}{l} a \\ ea \\ oo \\ ou \end{array} \right\}$ __e, e.g., base, grease, goose, house

Rules S20 and S21 are closely related to general primary vowel Rules 11 and 13 in that they involve the pronunciation of s between two vowels. However, they are especially unstable rules, both having numerous exceptions, in which the opposite correspondence holds.

S20: This rule applies when either V is a primary vowel (including y and silent e) or a secondary vowel. For a few words, Rule S20 applies when the word is used as a verb, but the [s] pronunciation is found when used as a noun or adjective, e.g., use, abuse, close.

S21: Rule S21 presents four special environments where Rule S20 does not apply. However, the rule does not work too well in the environment /ea__e, where there are a number of exceptions pronounced with [z] (Rule S20).

(Since Rule S21 involves the most common pronunciation of s ([s]), it could be sequenced along with Rule S10 (1,3). Then when S20 is taught, the environment for S21 could be specified.)

18,3: A22: a → [e], [ɛ], [æ] / __r, e.g., carry

This rule applies in three environments:

1. / __CV, e.g., vary. This is the same environment as for A13, under which the present exemplars could be subsumed. However, they have been placed here because their pronunciation is the same as in the following environment, in most dialects. In dialects where pronunciation differs (e.g., Mary [e] and marry [æ] contrast), these words must be coded A13.
2. / __rr, e.g., arrow. Rule A22 is particularly needed for this environment which differs from Rule A21 (9,1).
3. Other: The only examples in this category are scarce and scarcely which can be considered as exceptions to Rule A21 (9,1).

Note should be made here--as with all cases involving r--of considerable dialect variation.

(If Rule A25 is not taught in Second Year, this would be an appropriate place to introduce it.)

18,4: 025: o → [ɔ] / __#, e.g., go

This rule is similar to Rules E25 and Y19 (3,1), in that the long-vowel sound corresponds to a letter in final position. However, Rule 025 applies in words of any length and has no exceptions.

The following are correspondences for other final vowels:

a → [ɹ] / __# in stressed syllables, primarily one-syllable words, e.g., ha. See Volume II, Section III.

a → [ə] / __# unstressed in most words of two or more syllables, e.g., comma. See Rule A17 (10,1).

i → [i] / __#, e.g., ski, taxi. See Rule I35 (23,2).

u → [(y)u] / __#, e.g., flu, menu. See Volume II, Section III.

Block 19 (Silent letters)

Frequency = 287

Unit 1: Three-syllable words with suffixes:

-ment (23), -or (14), -ive (14),
-ness (12) -ance/-ant (18)

Frequency = 81

Unit 2: IE11 (8), I24 + GH10 (60), GH10 (13),
H20 (7)

Frequency = 88

Unit 3: K20 (26), G20 (9), W20 (24)

Frequency = 59

Unit 4: B20

Frequency = 13

Unit 5: L20 (21), T20 (19)

Frequency = 40

Unit 6: U20

Frequency = 6

Block 19 introduces three-syllable words with suffixes, and completes the introduction of single consonant correspondences by presenting "silent letters" (generally indicated by a rule numbered "20"), that is, those grapheme units which do not have a corresponding pronunciation (lack of pronunciation is indicated by \emptyset). In 19,2 the position of the grapheme units varies; in 19,3 they are initial; in 19,4, final; in 19,5 and 19,6, medial.

19,1: Three-syllable words with suffixes: -ment, -or, -ive, -ness, -ance/-ant.

-ment → [mənt], e.g., agreement

-or → [ər], e.g., inventor

-ive → [ɪv], e.g., attractive

-ness → [nɪs] or [nəs], e.g., eagerness

-ance/-ant → [əns]/[ənt], assistance, assistant

-ment: The ending -ment may occur as a pseudo-suffix, e.g.,
department

- or: The agent suffixes -or and -er (9,2) have the same meaning and pronunciation.
- ive: Words ending in -d(e), change to -s (pronounced [s]) when adding -ive, e.g., exclude, exclusive (cf, 21,3).
- ness: When adding -ness, final unstressed -y (Y17) changes to -i, also pronounced [i], e.g., happy, happiness.
- ance/-ant: These two suffixes (also, pseudo-suffixes) are grouped together because of their phonological and orthographical similarity, and because they are both often added to the same bases. Commonly, especially when the base ends in [t] or [d], a syllabic [n] ([ŋ] is used instead of [ən], thus [ps]/[pt].

19,2: IE14: ie → [ay] / __#, e.g., die

124 + GH10: i → [ay] / __gh, e.g., high

GH10: gh → ∅, e.g., bough

H20: h → ∅, e.g., hour

This unit begins with two cases of the [ay] pronunciation, Rules IE11 and 124 + GH10. It then covers other examples of silent gh and concludes with silent h.

IE11: This rule applies generally in one-syllable words and in compounds, that is, when stressed. (For unstressed final ie, see Rule IE17; medial ie is covered by Rule IE12. Both of these rules are introduced in Block 26.)

124 + GH10: In the present set of correspondences, igh is treated as i plus silent gh (see below). However,

it could be treated as one grapheme unit: igh → [ay].

There are no exceptions to this correspondence.

GH10: This is the major correspondence for gh. The exceptions are:

gh → [g] / # __, e.g., ghost;

gh → [g] medially and finally in a few words, e.g., spaghetti;

gh → [f] in about ten words, primarily finally, e.g., laugh.

H20: This rule includes a group of exceptions (a), plus two regular, but minor, rules (b and c):

a. h → ∅ / # __, e.g., hour;

b. h → ∅ / __ #, e.g., pooh;

c. h → ∅ / __ V_{unstressed}, e.g., graham.

In speech, rule (c) also applies to unstressed function words, e.g., hit him → [hɪtɪm] (= hit 'im).

19,3: K20: k → ∅ / # __ n, e.g., knee

G20: g → ∅ / { # __ n }_{n#}, e.g., gnat, sign

W20: w → ∅ / # __ r, e.g., write

K20: This invariant rule is a result of English phonotactics, which does not allow initial [kn].

G20: This invariant rule is also a result of English phonotactics, which does not allow initial or final [gn]. The environment / # __ n is the same as for. Rule K20 ([g] is the voiced counterpart of [k]). When the environment is / __ n #, a preceding i is

governed by Rule 122 (introduced in 13,3):

$\underline{i} \rightarrow [\text{ay}] / _\text{gn}\#, \text{ e.g., } \underline{\text{sign}}.$

W20: This invariant rule is also the result of English phonotactics, which does not allow initial [wr].

19,4: B20: $\underline{b} \rightarrow \emptyset / \text{m}_\#, \text{ e.g., } \underline{\text{bomb}}$

This invariant rule, like those in 19,3, is a result of modern English phonotactics, which does not allow final [mb].

19,5: L20: $\underline{l} \rightarrow \emptyset / \left\{ \begin{array}{l} \text{o}_\text{k} \\ \text{a}_\text{k} \\ \text{a}_\text{f} \\ \text{a}_\text{v} \\ \text{a}_\text{m} \end{array} \right\}, \text{ e.g., } \underline{\text{yolk}}, \underline{\text{walk}}, \underline{\text{half}}, \underline{\text{salve}}, \underline{\text{palm}}$

T20: $\underline{t} \rightarrow \emptyset / \left\{ \begin{array}{l} \text{s}_\text{le} \\ \text{s}_\text{en} \\ \text{f}_\text{en} \end{array} \right\} \#, \text{ e.g., } \underline{\text{castle}}, \underline{\text{listen}}, \underline{\text{often}}$

While rules L10 and T20 appear to be invariant, the [l] and the [t] are heard in many words (e.g., calm, often), due to spelling pronunciation.

L20: In addition to Rule L20, Rules 023 and A23 (13,2) apply to the sequences o!k and alk, respectively. Many exemplars of the sequence alm are irregular because of the following minor rule: $\underline{a} \rightarrow [\text{a}] / _\text{lm}, \text{ e.g., } \underline{\text{palm}}.$

T20: Note the alternation between forms ending in t(e) ($\rightarrow [\text{t}]$) and those ending with the suffix -en: fast/fasten, haste/hasten, soft/soften.

19,6: U20: $\underline{u} \rightarrow \emptyset / \#\text{g}_, \text{ e.g., } \underline{\text{guess}}$

The u here is a marker to indicate the [g] pronunciation of g.

Block 20 (Consonant digraphs; Double consonants)

Frequency = 119

- Unit 1: Three-syllable words with suffixes:
-y (12), -ful (8), -al (7), -able (6),
-eth (5), -less (4), -ist (4), -ish (2) Frequency = 48
- Unit 2: PH10 (19), CH31 (20) Frequency = 39
- Unit 3: TH12 Frequency = 26
- Unit 4: CC11 Frequency = 6

Block 20 continues the introduction of three-syllable words and concludes the introduction of double consonants and consonant digraphs.

- 20,1: Three-syllable words with suffixes: -y, -ful, -al, -able,
-eth, -less, -ist, -ish
- y → [i] (Rule Y17; 9,2), e.g., injury
- ful → [fʊl] (Rule U31; 13,1) or [fəl] (Rule U17; 10,1), e.g.,
colorful
- al → [əl], e.g., musical
- able → [əbəl], e.g., suitable
- eth → [iθ], e.g., fortieth
- less → [lɪs] or [ləs], e.g., odorless
- ist → [ɪst], e.g., organist
- ish → [ɪʃ], e.g., yellowish

-eth: The suffix -eth is a variant of the ordinal-number suffix -th (as in fourth) and is added to numbers ending in a vowel. The only vowel to which this applies is y (Y17: [i]) which changes to i [i] (Rule I36; 25,3) before -eth, e.g., twentieth.

20,2: PH10: ph → [f], e.g., phone

CH31: ch → [k], e.g., school

PH10: This is an invariant correspondence.

CH31: While often unpredictable, this correspondence always holds in the following environment: /#__^{r}}, e.g., chrome, chlorine. The correspondence is generally applicable in more common words with the environment /#s__, e.g., school. However, in a number of less common words (generally of German origin) the correspondence for sch is [ʃ], e.g., schwa.

20,3: TH12: th → [ð] / __^{e}_{er}^{ern} #, e.g., breathe, gather, northern

Note the alternation between [θ] (Rule TH11; 3,2) and [ð] in such pairs as wrath/rather, north/northern; this may be an automatic phonological change. Note also the alternation between short vowel plus [ð] and long vowel plus [ð] in such pairs as bath/bathe, breath/breathe; this is a grammatical alternation: nouns versus verbs.

The following correspondences apply with TH12:

o → [ə] / __ther (Rule O31), e.g., brother;

ea → [ɛ] / __ther (Rule EA31), e.g., weather.

20,4: CC11: cc → [ks] / __^e_{;}, e.g., success, accident

This rule was not used in Berdiansky et al. (1969), where words were coded C12, C11. (If Rules CC12 and GG10 are not taught in Second Year, this would be an appropriate place to introduce them.)

Block 21 (Palatalizations)

Frequency = 177

Unit 1: Three-syllable words with prefixes:
un- (19), re- (6), dis- (5), in- (4),
mis- (3) Frequency = 37

Unit 2: -tion Frequency = 81

Unit 3: -sion → [ʃən] (20), -sion → [zən] (12) Frequency = 32

Unit 4: -ture Frequency = 27

This block concludes the introduction of three-syllable words with affixes. For the first time, selected palatalizations are introduced, in both two- and three-syllable words. (The remaining, minor palatalizations are listed in Volume II, Section V.) Palatalizations are certain spelling-to-sound correspondences which result in the sounds [ʃ], [ʒ], [ʒ], and [ʃ] and are discussed in greater detail in Cronnell (1971, pp. 33-35). Words with palatalizations were coded "E" in Berdiansky et al. (1969). It is suggested that palatalizations be taught by contrasting base and suffixed forms, e.g., promote-promotion, permit-permission, decide-decision. This will promote learning of English phonology, cf, MacDonald (1969), Chomsky (1970).

21.1: Three-syllable words with prefixes: un-, re-, dis-, in-, mis-
un- → [ən], e.g., unbroken
re- → [ri] or [ri], e.g., reopen
dis- → [dis], e.g., disappear
in- → [in], e.g., inhuman
mis- → [mis], e.g., misbehave

21,2: -tion → [ʃən], e.g., vacation

This is the most common ending involving palatalization in the present lexicon. The suffix is generally only -ion (cf, -ssion and -sion; 21,3), but it is the t which is involved in palatalization, e.g., attract, attraction. (In some words -tion is a pseudo-suffix, e.g., nation.)

As when adding other suffixes beginning with a vowel, the final silent e on a base word is dropped, e.g., translate, translation. For certain base forms, the ending is -ation [éʃən], e.g., tempt, temptation. Note that whenever -(t)ion is added to a word, stress is on the syllable preceding the suffix, e.g., dónate, donátion.

In the environment /s__, -tion is pronounced [ʃən], e.g., suggestion. This is a phonological alternation and may be automatic.

A number of changes may occur in the base when -(t)ion is added. Those found in the present unit are listed below.

A. Long vowel in base word becomes short vowel in suffixed word, sometimes with attendant consonant changes.

1. ai → [e] → e [·] + tion, e.g., detain, detention
2. eive [iv] → ep [ɛp] + tion, e.g., receive, reception
3. ibe [ayb] → ip [ɪp] + tion, e.g., describe, description
4. u [u] → u [ə] + tion, e.g., reduce, reduction. (The pronunciation of c changes from [s] to [k]--Rule C11 to C12--because of the change in environment.)

B. Other changes

1. d → t / __ion, e.g., intend, intention

2. oi/oy [oy] → u [ə] + ction, e.g., destroy, destruction

21,3: -sion → [ʃən], e.g., mission, mansion

-sion → [ʒən], e.g., occasion

The ending -sion has two pronunciations, depending on environment: [ʃən] and [ʒən] (cf, the contrast of [s] and [z] in Rules S10 and S20). While -sion is sometimes a pseudo-suffix, e.g., mansion, it generally results from the suffix -ion, e.g., confession (cf, -tion; 21,2). All words in this unit are stressed on the syllable preceding -(ʃ) sion.

All occurrences of -ssion are pronounced [ʃən]. This ending comes from three sources in the present lexicon:

1. base word ending in ss + ion, e.g., discuss, discussion;
2. base word ending in t + ion → ssion, e.g., permit, permission;
3. base word ending in ede [id] + ion → ession [ʃən], e.g., procede, procession (cf, -ive; 19,1).

The ending -sion is pronounced [ʃən] in the environment /C__, where the consonant is not r, e.g., tension. The pronunciation [ʒən] for -sion occurs in the environment /V__, e.g., occasion, and in the environment /r__, e.g., excursion. In addition, this pronunciation results from suffixation:

1. Vd- [Vd] + ion → vsion [Vʒən], e.g., conclude, conclusion;
2. ide [ɪd] + ion → ision [fʒən], e.g., divide, division.

21,4: -ture → [ʃər], e.g., picture

In the present lexicon, this is the second most frequent ending involving palatalization. Most generally, -ture is a pseudo-suffix, e.g., future, although the regular affix -(t)ure is occasionally found, e.g., moisture, mixture.

Block 22 (Nonaffixed three-syllable words)

Frequency = 324

Unit 1	Stress pattern 3B	Frequency = 92
Unit 2:	Stress pattern 3A	Frequency = 124
Unit 3:	Stress pattern 3C	Frequency = 89
Unit 4:	Stress pattern 3D	Frequency = 19

Block 22 introduces nonaffixed three-syllable words. Since no new correspondences are used and since the concept of three syllables has been employed previously (17,1; 17,3; 19,1; 20,1; Block 21), what is primarily introduced in this block is new stress patterns. These are important because of their effect on the pronunciation of vowels: vowels in unstressed syllables are pronounced using general primary vowel Rule 17 ([ə], or in the case of y, Rule Y17: [i]), while vowels in stressed syllables are pronounced employing other correspondences. For describing stress, the following symbols are used:

- ˈ: primary stress: full pronunciation of the vowel;
- ˌ: secondary stress: full pronunciation of the vowel, but with less prominence than for primary stress;
- : unstressed: [ə] as the pronunciation of a, e, i, o, u; [i] as the pronunciation of y.

The difference between primary and secondary stressed vowels is probably not of importance for teaching, so long as they receive their full pronunciation. The main concern is that unstressed vowels should not receive a full pronunciation, but should be pronounced [ə] (or [ɪ] for unstressed y).

Note should be made here that the precise pronunciation of unstressed vowels varies from dialect to dialect, from speaker to speaker, and from word to word. While [ə] is the most common unstressed-vowel sound, [ɪ] and other varieties of vowels may be used. In some words, the pronunciation of unstressed u varies between [ə] and [(y)u], often being pronounced [yə], e.g., formula. With stress pattern 3C, the first vowel in some words may have its full pronunciation, e.g., antenna.

Four stress patterns have been found which are applicable to the three-syllable words in the present lexicon:

22,2: Stress pattern 3A: '---, e.g., carnival

22,1: Stress pattern 3B: '--', e.g., hurricane

22,3: Stress pattern 3C: -'-, e.g., umbrella

22,4: Stress pattern 3D: '-'. e.g., kangaroo

Stress patterns 3A and 3B are closely related, the difference being that in 3A the final vowel is unstressed, while in 3B the final vowel has its full form. It may be preferable to consider these patterns as subcategories of one overriding pattern. (Certain words belong to either stress pattern 3A or 3B, depending on form class; e.g., estimate as a verb is 3B [ˈstɛmət], as a noun 3A [ˈstɛmɪt].) In sequencing three-syllable stress patterns, 3B has been placed before 3A because both the first and last vowels of 3B can be pronounced using major, environmentally

governed correspondences. It is felt that the two unstressed vowels of 3A will be more difficult than the one of 3B. Otherwise, the criterion for sequencing stress patterns is frequency. Within each unit, stress patterns are ordered on the basis of the spelling-to-sound correspondences for the last vowel.

Fourth Year

(Low-frequency primary and secondary vowels; Four-syllable words;
Affixes; Four-syllable stress patterns)

Frequency = 1129

Review Block

It is assumed that Fourth Year will begin with review. However, no specific suggestions are made in this report. Since there are over 3000 exemplars given for Third Year, there should be sufficient material for review.

Block 23 (Specific primary vowel rules)

Frequency = 151

Unit 1: A29 (29), A24 (43) Frequency = 72

Unit 2: I35 (21), I25 (27) Frequency = 48

Unit 3: Y11 (8), Y13 (6), Y15 (7), Y16 (10) Frequency = 31

Blocks 23, 24, and 25 introduce the remaining, minor correspondences for primary vowels (with the exception of general primary vowel Rule 32 in 27,6). In general, specific vowel rules are introduced in Block 23, while Blocks 24 and 25 cover rules generalizable across all vowels (general primary vowel rules).

23,1: A29: a → [e] / __^{nge}_{ste#}, e.g., danger, paste

A24: a → [a] / {^w_{qu}} __, e.g., wad, squat

This unit includes special rules for the letter a.

A29: This is a limited extension of Rule A11. Rule A29 applies even if the e is lost from the environment when suffixes are added, e.g., haste, hastily.

A24: This rule applies only when the following consonant sound is not a velar (i.e., is not [k, g, ŋ]); thus it does apply before k, ng, x, c pronounced [k], or g pronounced [g]. It also does not apply before r, where Rule A25 (9,3) is used. There is a considerable amount of dialect and idiolect variation among exemplars of this rule, with [ɔ] often being used.

23,2: 135: i → [i], e.g., police

125: i → [y] / C__V_{unstressed}, e.g., junior

This unit includes special rules for the letter i.

135: This exception rule covers words which were coded as irregular in Berdiansky et al. (1969). It is unpredictable except in the environment / __#, where it always holds, e.g., ski (with the exception of l and hi).

125: In this rule, i functions unpredictably as a consonant. The most common environment is / {_n} __, e.g., million, onion.

23,3: Y11: y → [ay] / __Ce#, e.g., type

Y13: y → [ay] / __CV, e.g., tyrant

Y15: y → [ɪ] / __C(C)#, e.g., gym

Y16: y → [ɪ] / __CC..., e.g., system

General primary vowel Rules 11-16 are applicable to y, where the pronunciation is the same as for i. Because of low frequency, the y rules have been postponed until this unit.

Block 24 (Four-syllable words; Rules for exceptions to general primary vowel Rule 13)

Frequency = 223

- Unit 1: Four-syllable compounds (11); Four-syllable compounds with suffixes:
-ing (7), -y (1), -er (6), -or (8),
-en (1), -ed (2), -ly (14) Frequency = 50
- Unit 2: E38 (38), 138 (22), A38 (21), 038 (8) Frequency = 89
- Unit 3: A28 (19), 128 (17), Y28 (2), 028 (20),
E28 (9) Frequency = 67
- Unit 4: General primary vowel Rule 27 Frequency = 17

Block 24 marks the introduction of four-syllable words. In addition, rules are introduced which provide for exceptions to general primary vowel Rule 13; i.e., rules which provide for $V \rightarrow [\check{V}] / __\text{CV}$ (cf, 18,1).

24,1: Four-syllable compounds

Four-syllable words with suffixes: -ing, -y, -er, -or, -en, -ed, -ly. This unit begins the introduction of four-syllable words, which continues in the first unit of each block until Block 27, where they are thoroughly introduced. The sequence and method of introducing four-syllable words is similar to that used for three-syllable words in Third Year. (See 17,2 and 17,3 for comments on suffixes.)

- 24,2: E38: e \rightarrow [ɛ] / $__\{\check{V}\}V$, e.g., Texas, level
- 138: i \rightarrow [ɪ] / $__\{\check{V}\}V$, e.g., river
- A38: a \rightarrow [æ] / $__\{\check{V}\}(l)V$, e.g., axis, axle, cavern
- 038: o \rightarrow [a] / $__\{\check{V}\}V$, e.g., oxen, novel

General primary vowel exception Rule 38 is as follows:

$V \rightarrow [\check{V}] / _ \{ \overset{x}{\underset{V}{V}} \} (1)V$; it does not apply to u or y for any words in the present lexicon; nor are there exemplars of i in the environment $/ _ xV$. The environment including l appears only in one word, axle. The rule always works for x, which can never be doubled and which functions as a consonant cluster (the CC in general primary vowel Rule 16, which always applies to primary vowels before x). For vowels before v, there is considerable variation between Rules 13 and 38 (cf, evil, devil), and it may be advisable to eliminate this rule for v. (Exemplars with v could be taught as exceptions to Rule 13; see 18,1.)

24,3: A28: $\underline{a} \rightarrow [æ] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$, e.g., magic, rapid, radish, habit

I28: $\underline{i} \rightarrow [ɪ] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$, e.g., clinic, timid, finish, limit

V28: $\underline{y} \rightarrow [ɪ] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$, e.g., physic

O28: $\underline{o} \rightarrow [a] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$, e.g., phonics, solid, abolish, profit

E28: $\underline{e} \rightarrow [ɪ] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$, e.g., relic, cherish, credit

General primary vowel Rule 28 is as follows: $V \rightarrow [\check{V}] / _ C \left\{ \begin{array}{l} ic \\ id \\ ish \\ it \end{array} \right\}$.

This rule does not generally apply to u. The endings id, ish, and

it are not suffixes, but ic may be and in such cases the base and affixed forms should be contrasted in order to promote learning of English phonology (cf, MacDonald, 1969; Chomsky, 1970). Stress is always on the syllable before the ending, even when the base form is stressed otherwise (e.g., áthlete, athlétic).

An alternative approach to the above sequence is teaching each letter in each environment, i.e.:

$V \rightarrow [\check{V}] / __C ic$

$V \rightarrow [\check{V}] / __C it$

$V \rightarrow [\check{V}] / __C ish$

$V \rightarrow [\check{V}] / __C id$

Y28: The only exemplars of Rule Y28 are in the environment
/ $__C ic$.

E28: There are no exemplars of Rule E28 in the environment
/C id.*

24,4: General primary vowel Rule 27

General primary vowel Rule 27 is as follows: $V \rightarrow [\check{V}] __C ity$, e.g., humanity, ability. Rule 27 could be included in general primary vowel Rule 28 (24,3) but has not, however, since its occurrence involves four-syllable words. In addition, most exemplars of Rule 28 are cases of base plus -ity ($\rightarrow [\text{əti}]$), and it is probably appropriate to teach this rule in terms of contrast between the base and suffixed forms to promote learning of English phonology (cf, MacDonald, 1969; Chomsky, 1970). Note that the last vowel in most base forms is unstressed ($[\text{ə}]$ or $[\text{i}]$), changing to $[\check{V}]$ when the suffix is added. As with Rule 28, the syllable

before the ending (-ity) is stressed, e.g., moral [móral], mórality [mórələti].

Because of the limited number of exemplars, this rule is not taught by individual letters, but is generalized across letters.

Block 25 (Remaining general primary vowel rules)

Frequency = 240

Unit 1: Four-syllable words with - <u>tion</u>	Frequency = 61
Unit 2: I26 (30), Y26 (2), U26 (11), E26 (15), O26 (3), A26 (2)	Frequency = 63
Unit 3: I36 (35), Y36 (2)	Frequency = 37
Unit 4: A12 (18), I12 (9), Y12 (2), O12 (2), U12 (2)	Frequency = 33
Unit 5: E14 (20), I14 (9), Y14 (4), A14 (6), O14 (4), U14 (3)	Frequency = 46

25,1 continues the introduction of four-syllable words. Units 2-5 of Block 25 mainly introduce new rules for the "long" pronunciation of primary vowels. Units 2 and 3 are concerned with the pronunciation of a vowel followed by a vowel, while units 4 and 5 are extensions of the "long-vowel" rules.

25,1: Four-syllable words with -tion → [ʃən]

Comments applicable to -tion are found in 21,2. It should be noted that primary stress always falls on the syllable before -tion; however, for four-syllable words there is secondary stress on the first syllable. Thus the stress pattern is '-'-', with unstressed vowels in the second and last syllables. These stress considerations may cause sizable pronunciation differences between base and suffixed forms (e.g., console [kənsól], consolation [kənsələʃən]), which should be contrasted when teaching palatalizations.

Within this unit there are two cases of exceptions to general primary vowel Rule 13:

- a. the ending -ition pronounced [fʃən];
- b. the first vowel having a "long" sound in the base, but a "short" sound in the suffixed form, e.g., recite, recitation.

- 25,2: I26: i → [ay] / __-V, e.g., lion
 Y26: y → [ay] / __-V, e.g., hyena
 U26: u → [(y)u] / __-V, e.g., duet
 E26: e → [i] / __-V, e.g., create
 O26: o → [o] / __-V, e.g., poet
 A26: a → [e] / __-V, e.g., mosaic

This unit introduces general primary vowel Rule 26:

$V \rightarrow [\bar{V}] / _ - V$. The hyphen indicates syllable division, to differentiate two separate vowels from a secondary vowel. In many cases where this rule applies, there is no possibility of confusion with secondary vowels; e.g., the sequence io is never a secondary vowel and must always be treated as two primary vowels, as in riot. However, in some cases a vowel sequence may be either a secondary vowel or two primary vowels, cf, the ea in sea [i] and area [ia]. In such cases, there is no way to determine which is the correct interpretation except by trial and error.

The vowel following a Rule 26, in most words, is unstressed [ə], e.g., riot [ráyət], area [éris].

I26: This rule should be compared with Rule 125, where the i is pronounced [y], e.g., million.

Y26: This rule is another case of the applicability of general primary vowel rules to y, which has the same pronunciation as i.

25,3: I36: i → [i] / __-V, e.g., Indian

Y36: y → [i] / __-V, e.g., embryo

These exception rules have the same environment as Rules 126 and Y26, but a different pronunciation.

I36: Cf, Rule 135 (23,2) which has the same pronunciation.

25,4: A12: a → [e] / __C{r}e#, e.g., table

I12: i → [ay] / __C{r}e#, e.g., title

Y12: y → [ay] / __C{r}e#, e.g., cycle

O12: o → [o] / __C{r}e#, e.g., noble

U12: u → [(y)u] / __C{r}e#, e.g., bugle

This unit introduces general primary vowel Rule 12:

$V \rightarrow [\bar{V}] / _C\{\bar{r}\}e\#$, which is an extension of Rule 11 (Block 6), with r or l between the consonant and the final e. The environment / __Cre# occurs only if the consonant is g or c, when er would indicate the G11 or C11 pronunciations rather than the desired G12 or C12. The only examples of this in the present lexicon are acre and ogre, where re is pronounced [ər] and is thus irregularly-spelled (see Volume II, Section III).

The rule apparently has no exemplars with e.

25,5: E14: e → [i] / __C{r}V, e.g., secret, cathedral

I14: i → [ay] / __C{r}V, e.g., library, biplane

Y14: y → [ay] / __C{r}V, e.g., hydrant, cyclone

A14: $\underline{a} \rightarrow [e] / __C\{\overset{r}{\downarrow}\}V$, e.g., April

O14: $\underline{o} \rightarrow [o] / __C\{\overset{r}{\downarrow}\}V$, e.g., okra, only

U14: $\underline{u} \rightarrow [(y)u] / __C\{\overset{r}{\downarrow}\}V$, e.g., lubricate, duplicate

This unit introduces general primary vowel Rule 14:

$V \rightarrow [\bar{V}] / __C\{\overset{r}{\downarrow}\}V$, which is an extension of Rule 13 (18,1) and is similar to Rule 12 (23,4).

E14: In unstressed syllables, this may be pronounced [ɪ] or [ə].

A14: There are no exemplars of this rule in the environment $/ __CIV$.

Block 26 (Low-frequency secondary vowel rules)

Frequency = 311

Unit 1: Four-syllable words with suffixes:

-able (19), -ment (5), -al (8),
-ness (2), -ary (2), -ist (1)

Frequency = 37

Unit 2: IE17 (12), EY17 (23)

Frequency = 35

Unit 3: AI17

Frequency = 10

Unit 4: EA33

Frequency = 18

Unit 5: IE12 (39), EI10 (15)

Frequency = 54

Unit 6: EY10 (9), EI20 (19)

Frequency = 28

Unit 7: -ous (38), OU31 (26), OU35 (27),
OU33 (19), OU34 (11)

Frequency = 121

Unit 8: UI31

Frequency = 8

This block continues the introduction of four-syllable words and concludes the teaching of secondary vowel rules.

26,1: Four-syllable words with suffixes: -able, -ment, -al, -ness, -ary, -ist

See 19,1 and 20,1 for discussion of these suffixes.

26,2: IE17: ie → [i] / __# in unstressed syllables, e.g., hippie

EY17: ey → [i] / __# in unstressed syllables, e.g., honey

Both rules in this unit occur in unstressed syllables in word-final position. Both are pronounced the same: [i] (or [ɪ], particularly in connected speech). Both, but especially IE17, are common in proper names (see Volume II, Section IV).

IE17: For stressed final ie see Rule IE11 (19,2). Medial ie is Rule IE12 (26,5).

EY17: Stressed ey is covered by Rule EY10 (26,6).

26,3: AI17: ai → [ə] in unstressed syllables, e.g., villian

All exemplars of this rule are in the environment / __n#. As with general primary vowel Rule 17, pronunciation varies between [ə] and [ɪ]. In many cases, a vowel is not pronounced, leaving a syllabic [n], e.g., mountain [máwnnt̩].

26,4: EA33: ea → [ə] / __r, e.g., earn

This is an exception rule, in that Rules EA11 and EA31 (12,2) are regularly found before r, e.g., hear, bear. Rule EA33 groups together all cases of ear pronounced [ər], [ə]), e.g., heard.

26,5: IE12: ie → [i] / ...__..., e.g., field

EI10: ei → [i], e.g., seize

Both rules have the same pronunciation ([i]) and occur only medially.

IE12: Final ie is covered by Rules IE11 (19,2) and IE17 (26,2). In addition, the sequence ie may be a combination of i and e, e.g., diet (see Rule 126 in 25,2).

E110: The other pronunciation of ei is covered by Rule E120 (26,6) with which E110 could be contrasted.

26,6: EY10: ey → [e], e.g., they

E120: ei → [e] / __ {^{gh}_{gn}}, e.g., weigh, reign, vein

These two rules have the same pronunciation, and are in complementary distribution, EY10 occurring finally and E120 occurring initially and medially.

EY10: This rule applies in stressed syllables, primarily in one-syllable words. Unstressed ey is covered by Rule EY17 (26,2). The only exceptions to this rule are key and eye and their derivatives.

E120: For words with the environment / __gh, the gh is always silent (GH10 in 19,2). The environment / __n does not necessarily specify this rule, cf., protein, E110 (26,5).

26,7: -ous → [əs], e.g., dangerous

OU31: ou → [ə], e.g., touch

OU35: ou → [o], e.g., though

OU33: ou → [u], e.g., soup

OU34: ou → [ɔ], e.g., fought

This unit introduces the many remaining pronunciations of ou, the major one, OU10, having already been taught (16,2). Rule OU31

governs the pronunciation of the -ous ending, which is presented first because of its high frequency and consistency. Burmeister (1968) found OU31 to be the most frequent rule for ou in a 20,000 word corpus, due primarily to this ending.

-ous: The ending -ous is both a suffix and a pseudo-suffix, e.g., joyous, jealous.

OU34: The sequence our is pronounced [ər] ([ə]), e.g., courage.

OU35: All but one of the exemplars of this exception rule are in the environments / ^{gh}_r . The pronunciation of our is variable, e.g., four.

OU33: The pronunciation [yu] seems not to occur for this rule. except variably in coupon.

OU35. All exemplars of this exception rule occur only in the environment / ght. The gh is silent (Rule GH10) and ought could be taught as a grapheme unit pronounced [ɔt]. In some dialects [a] is the pronunciation for this rule.

26,8: UI31: ui → [ɪ], e.g., built

All exceptions to Rule UI10 (16,6) are covered by this rule. The words are either build and its derivatives, or cases of unstressed ui, e.g., biscuit.

Block 27 (Four-syllable words; General primary vowel Rule 32)

Frequency = 204

Unit 1: Four-syllable words with prefixes:
un- (8), in- (6), dis- (3), mis- (2) Frequency = 19

Unit 2: Stress pattern 4A (59), Stress pattern 4B (10) Frequency = 69

Unit 3: Stress pattern 4C	Frequency = 23
Unit 4: Stress pattern 4D	Frequency = 14
Unit 5: Other four-syllable words	Frequency = 7
Unit 6: E32 (49), 032 (13), A32 (7), I32 (3)	Frequency = 72

Block 27 concludes the introduction of four-syllable words and introduces general primary vowel Rule 32.

27,1: Four-syllable words with prefixes: un-, in-, dis-, mis-,

See 21,1 for discussion of these prefixes.

27,2; 27,3; 27,4; 27,5: Four-syllable words

These units introduce nonaffixed four-syllable words. Since no new correspondences are used and since the concept of four syllables has been employed previously (24,1; 24,4; 25,1; 26,1; 27,1), what is primarily introduced in this block is new stress patterns. See Block 22 for discussion of stress, stress symbols, and unstressed vowels and their pronunciation.

Four stress patterns have been identified which are applicable to the four-syllable words in the present lexicon:

27,2: Stress pattern 4A: -'-- , e.g., asparagus

Stress pattern 4B: -'-', e.g., abbreviate

Stress pattern 4A and 4B are closely related, the difference being that in 4A the final vowel is unstressed, while in 4B the final vowel has its full form. It may be preferable to consider these patterns as subclasses of one overriding pattern.

27,3: Stress pattern 4C: '-'- , e.g., tonsillitis

27,4: Stress pattern 4D: '-'- , e.g., alligator

27,5: Other four-syllable words

This is a small set of words with miscellaneous stress patterns:

'---, e.g., accuracy

'--', e.g., meteorite

'--', e.g., marionette

27,6: E32: e → ∅, e.g., difference

O32: o → ∅, e.g., history

A32: a → ∅, e.g., separate (Aj)

I32: i → ∅, e.g., aspirin

There are a number of words where a graphemic medial vowel is not generally pronounced ($V \rightarrow \emptyset$), although an alternate pronunciation with the vowel (unstressed, pronounced [ə]) is usually possible, even if over-precise. These unpronounced vowels are coded as general primary vowel Rule 32. Very of' they are in the environment /__r, e.g., every.

This unit includes potential three-syllable words reduced to two syllables and potential four-syllable words reduced to three syllables.

There are no exemplars of general primary vowel Rule 32 for u or y.

E32: Many of the exemplars of Rule E32 have unpronounced e in the ending -ery (→ [ri]), e.g., scenery. Very often this results when -y is added to a base ending in -er, silver [sɪlvər], silvery [sɪlvri].

APPENDIX A

Key to Pronunciation and Symbols

Key to Pronunciation

The following phonetic symbols are used to indicate pronunciation. The symbols used in *Webster's New World Dictionary* (1957) are given on the right for reference.

<u>Symbol</u>	<u>Key words (corresponding graphemes underlined)</u>	<u>Dictionary Symbol</u>
Vowels		
[i]	sc <u>e</u> ne, <u>n</u> eat, <u>s</u> ee, <u>ch</u> ief	\bar{e}
[ɪ]	b <u>i</u> t, h <u>i</u> dden	i
[e]	<u>n</u> ame, <u>d</u> ay, <u>th</u> ey	\bar{a}
[ɛ]	g <u>e</u> t, h <u>ea</u> d	e
[æ]	f <u>a</u> t, b <u>a</u> d	a
[ɑ]	h <u>o</u> t, c <u>a</u> r	o
[ɔ]	s <u>o</u> ng, l <u>o</u> ss, t <u>a</u> ught, l <u>a</u> wn, t <u>a</u> lk, b <u>a</u> ll, th <u>o</u> ught	\hat{o}
[o]	b <u>o</u> ne, g <u>o</u> , f <u>o</u> rk, t <u>o</u> e, b <u>o</u> ard, k <u>no</u> w	\bar{o}
[ʊ]	p <u>u</u> t, p <u>u</u> sh, b <u>oo</u> k, c <u>ou</u> ld	oo
[u]	f <u>oo</u> d, d <u>ew</u> , t <u>u</u> ne	\bar{oo}
[ə]	b <u>u</u> t, <u>a</u> b <u>o</u> ve	(unstressed) ə (stressed) u
[aɪ]	c <u>r</u> y, m <u>i</u> ne, d <u>ie</u>	\bar{i}
[aʊ]	f <u>o</u> und, <u>ow</u> l	ou
[ɔɪ]	b <u>oy</u> , n <u>oi</u> se	oi

<u>Symbol</u>	<u>Key words (corresponding graphemes underlined)</u>	<u>Dictionary Symbol</u>
Consonants		
[b]	<u>b</u> oy, ca <u>b</u>	b
[ç]	<u>ch</u> urch, <u>ch</u> ip, ha <u>ch</u>	ch
[d]	<u>d</u> ead, <u>d</u> o	d
[f]	<u>f</u> un, <u>f</u> air, <u>off</u>	f
[g]	<u>g</u> o, <u>g</u> ay, <u>egg</u>	g
[h]	<u>h</u> ome, <u>h</u> ead	h
[j]	<u>j</u> udge, <u>g</u> em, a <u>g</u> e	j
[k]	<u>k</u> ill, <u>k</u> ick, <u>c</u> ome, <u>c</u> at	k
[l]	<u>l</u> et, <u>l</u> itt <u>le</u>	l
[m]	<u>m</u> an, ha <u>m</u>	m
[n]	<u>n</u> o, ha <u>n</u> d	n
[ŋ]	si <u>ng</u> , si <u>ng</u> le, thi <u>nk</u>	ŋ
[p]	<u>p</u> ull, tri <u>p</u>	p
[r]	<u>r</u> ed, fa <u>r</u>	r
[s]	<u>s</u> ee, <u>i</u> ce, mi <u>ss</u>	s
[ʃ]	<u>sh</u> e, <u>s</u> ure, i <u>ss</u> ue, na <u>ti</u> on, ha <u>sh</u>	sh
[t]	<u>t</u> en, hi <u>t</u> , li <u>k</u> ed	t
[v]	<u>v</u> ase, lo <u>v</u> e	v
[w]	<u>w</u> et, la <u>ng</u> uage, qu <u>ic</u> k	w
[y]	<u>y</u> et, <u>y</u> ou	y
[z]	<u>z</u> oo, la <u>z</u> y, plea <u>s</u> e, wi <u>v</u> es	z
[ʒ]	vi <u>si</u> on, trea <u>s</u> ure	zh
[θ]	<u>th</u> ing, ba <u>th</u>	th
[ð]	<u>th</u> em, ba <u>th</u> e	th

Key to Symbols

Parts of speech

Aj = adjective

N = noun

Vb = verb

Other symbols

P = alternate pronunciation (e.g., for either, route)

AS = alternate stress pattern (e.g., for invalid), generally also involving an alternate pronunciation (P)

ε = a final silent e (Rule E18) which is dropped when adding a suffix (e.g., hide, hiding)

V = vowel

C = consonant

Ø = silent letter

Symbols used in stating rules of correspondence are described in Berdiansky, Cronnell, and Koehler (1969, pp. 14-15). Additionally, in the present report, the arrow (→) is sometimes used to represent a orthographic change: e.g., y → i + ly (i.e., y becomes--is changed to--i when ly is added, e.g., happy, happily).

APPENDIX B

GLOSSARY

- AFFIX:** a nonfree form added to a word to make a new word, e.g., the un- in unfair, the -s in boys. Affixes include both prefixes and suffixes.
- BASE (WORD):** a word to which an affix is added forming a new word; e.g., boy is the base in boys.
- BISYLLABLE:** a two-syllable word.
- COMPOUND:** a word composed of two (or more) words, e.g., goldfish, houseboat.
- COMPLEMENTARY DISTRIBUTION:** a situation in which two sounds or two grapheme units do not contrast in the same environment and are thus classed together. E.g., in English aspirated [t^h] and unaspirated [t] are in complementary distribution, since the former occurs initially, while the latter never does. The grapheme units oi and oy are in complementary distribution since the former occurs only initially and medially, while the latter generally occurs only finally.
- CONSONANT DIGRAPH:** a grapheme unit composed of two or more consonant letters, e.g., th, ck, qu.
- CONSONANT CLUSTER:** a series of two or more consonant grapheme units, e.g., spr, nch, nk. Also called a consonant blend.
- DIALECT:** the way a language is spoken (or written) by any group of speakers. Dialects may be based on geographical, social or ethnic differences, but the term does not indicate any value judgment. The dialect used in this activity is known as "General American," a somewhat vague term for the type of English most commonly spoken in the United States.
- DIGRAPH:** a two-letter grapheme unit, e.g., ch, oa. This term is generally applied to consonants, vowel digraphs being called secondary vowels.
- DOUBLE CONSONANT:** a grapheme unit composed of two occurrences of the same consonant, e.g., dd, ll. Because of English phonotactics, most spelled double consonants are pronounced the same as a single consonant, e.g., d → [d], dd → [d]. Because of environmental constraints on c and g, this does not completely apply to cc and gg; nor does it apply to words containing morpheme boundaries, e.g., dd → [dd] in midday. The term "geminate" is sometimes used when describing double consonants.
- ENVIRONMENT:** other letters or sounds in a word which affect a spelling-to-sound correspondence. Indicated by a slash (/) and by underlining in the position of the correspondence. E.g., the environment / r means that the correspondence occurs when the grapheme unit is followed by r.

EXCEPTION: a grapheme unit in a word for which no (listed) spelling-to-sound correspondence is applicable. Words containing exceptions are also called exceptions. Since such exceptions were coded "40," the words are sometimes known as "40 words." The term "irregular" refers to exceptions.

EXEMPLAR: a word containing a particular spelling-to-sound correspondence

40 WORDS: see EXCEPTION.

GEMINATE CONSONANTS: see DOUBLE CONSONANTS.

GRAPHEME: a unit of an alphabet; a letter. For English, any of the 26 letters.

GRAPHEME UNIT: one or more letters (graphemes) functioning as a unit in deriving spelling-to-sound correspondences, e.g., a, t, mm, oy, th, qu. Whatever is on the left-hand side of a rule of correspondence is a grapheme unit.

GRAPHOTACTICS: restrictions on the combination of letters and grapheme units in a particular language; e.g., x is never doubled and q is always followed by u in English. Some graphotactic restrictions are the result of phonotactic restrictions; e.g., no English word can begin with ft. Cf, PHONOTACTICS.

IRREGULAR: see EXCEPTIONS.

LONG VOWELS: the sounds [e, i, ay, o, (y)u].

MONOSYLLABLE: a one-syllable word.

MULTISYLLABLE: a word of two or more syllables.

ORTHOGRAPHY: the spelling system of a language.

PALATALIZATION: the process which accounts for many occurrences of the palatal sounds [ʃ, ʒ, ʧ, ʝ] as in nation, vision, nature, gradual. While this is basically a phonological process, it is also used to describe certain spelling-to-sound correspondences.

PHONOLOGY: the sound system of a language.

PHONOTACTICS: restrictions on the combination of sounds in a particular language; e.g., no word in English can begin with [tt]. Cf, GRAPHOTACTICS.

POLYSYLLABLE: a word of three or more syllables.

PRIMARY VOWEL: a grapheme unit composed of a single vowel letter, i.e., a, e, i, o, u, y.

PSEUDO-AFFIX: commonly recurring word parts which look like suffixes and prefixes, but which do not act as such grammatically and semantically, e.g., the com [kəm] in commit, communion, and communicate. In general, pseudo-affixes were historically affixes (e.g., Latin com- < cum 'with'), but they have lost their independent status. In some cases, true affixes and pseudo-affixes share the same form, e.g., rename/repair, re-form ('form again')/reform.

RULES OF CORRESPONDENCE: see SPELLING-TO-SOUND CORRESPONDENCE.

SECONDARY VOWEL: a grapheme unit composed of two (or more) vowel letters, e.g., ee, oa, ay. Also called "vowel digraph."

SHORT VOWELS: the sounds [æ, ɛ, ɪ, ʌ, ə].

SILENT LETTER: a letter in a word for which there is no corresponding sound in the pronunciation of the word (symbolized by Ø). Some silent letters mark the pronunciation of other letters, e.g., the e in name; some are graphotactic devices, e.g., the e in have; some are anachronisms or scribal inventions, e.g., the gh in bough, the b in debt.

SPELLING-TO-SOUND CORRESPONDENCE: the relationship between the spelling and pronunciation of a grapheme unit. Also called spelling-to-sound correspondence rules and rules of correspondence (rules, for short).

STRESS: the degree of prominence found on a syllable. The basic distinction is spelling-to-sound correspondences in between stressed (marked ' over a vowel) and unstressed (unmarked) syllables. In polysyllabic words it is useful to recognize two levels of stress: primary (') and secondary ('), e.g., accommodate. Stress is sometimes called accent.

SYLLABLE: a segment of speech containing one vowel sound and optional consonant sounds. (In addition, certain consonant sounds may be syllabic).

SYLLABLE DIVISION: the division between two syllables. Phonologically this is a disputed and unclear matter in English. Orthographically, syllable division is regulated by dictionaries and printers manuals. In this report, syllable division is indicated only in clear-cut cases when necessary for interpretation of the rules of correspondence.

VOICE: vibration of the vocal chords during speech. All vowels are voiced (i.e., have voice), as are the following consonants: [b, d, g, v, ɒ, z, ʒ, j, m, n, ŋ, r, l, w, y]. The voiceless consonants [p, t, k, f, θ, s, ʃ, ʒ, h] are produced without vibration of the vocal chords. The voiced/voiceless distinction is of particular importance in the pronunciation of the -s and -ed suffixes.

APPENDIX C

Spelling-to-Sound Correspondences: Rule Description, Exemplars, Position in Sequence

Spelling-to-sound correspondences for primary vowels

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
A	11	a → [e] / __Ce#	name, brave	6,1
	12	a → [e] / __Ct ^r e#	acre, stable	25,4
	13	a → [e] / __CV	baby, nature	18,1
	14	a → [e] / __Ct ^r V	April, fragrant	25,5
	15	a → [æ] / __C(C)#	sat, fast	1,1
	16	a → [æ] / __CC....	saddle, jacket	8,2
	17	a → [ə], [ɪ] in unstressed syllables	above, final	10,1
	21	a → [ɑ] / __{ ^{rC} _{r#} }	cart, car	9,1
	22	a → [ɪ], [æ] / __r	vary, marry	18,3
	23	a → [ɔ] / __{ ^{ll} _{lk} lt ld}	ball, walk, salt, bald	13,2
	24	a → [a], [ɔ] / { ^w _u }__	wad, squat	23,1
	25	a → [o] / { ^{wh} _{w qu} }__r	wharf, war, quart	9,3

For further description of these rules and of the rule notation, see Berdiansky, Cronnell and Koehler (1969), Cronnell (1971), and Section III of this report. Asterisked rules do not appear in the earlier reports.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
A	26:	$a \rightarrow [e] / __ -V$	mosa <u>a</u> ic	25,2
	27*:	$a \rightarrow [\text{æ}] / __ C \text{ity}$	human <u>i</u> ty, capac <u>a</u> city	24,4
	28*:	$a \rightarrow [\text{æ}] / __ C \begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	mag <u>i</u> c, rap <u>i</u> d, rad <u>i</u> sh, hab <u>i</u> t	24,3
	29	$a \rightarrow [e] / __ \begin{Bmatrix} nge \\ ste \end{Bmatrix} \#$	stran <u>e</u> , past <u>e</u>	23,1
	32	$a \rightarrow \emptyset$	separ <u>a</u> te	27,6
	38	$a \rightarrow [\text{æ}] / __ \begin{Bmatrix} vV \\ x(1)V \end{Bmatrix}$	cav <u>a</u> rn, ax <u>i</u> s ax <u>a</u> le	24,2
E	11	$e \rightarrow [i] / __ C e \#$	scen <u>e</u> , her <u>e</u>	6,2
	13	$e \rightarrow [i] / __ CV$	her <u>e</u> , met <u>e</u> r	18,1
	14	$e \rightarrow [i] / __ C \cdot \begin{Bmatrix} r \\ l \end{Bmatrix} V$	zebr <u>a</u> , decl <u>a</u> re	25,5
	15	$e \rightarrow [e] / __ C(C) \#$	set <u>e</u> , felt <u>e</u>	1,4
	16	$e \rightarrow [e] / __ CC \dots$	edg <u>e</u> , extr <u>a</u>	8,2
	17	$e \rightarrow [ə], [ɪ] \text{ in unstressed syllables}$	hidd <u>e</u> n, tal <u>e</u> nt, magn <u>e</u> t	10,1
	18	$e \rightarrow \emptyset / __ \#$	nam <u>e</u> , edg <u>e</u> , immens <u>e</u> , mic <u>e</u>	6,1
	19	$e \rightarrow \emptyset / __ \begin{Bmatrix} s \\ d \end{Bmatrix}$	arm <u>e</u> d, wiv <u>e</u> s	--- ¹⁰
	21	$e \rightarrow [ə] / __ \begin{Bmatrix} rC \\ r \# \end{Bmatrix}$	her <u>d</u> , fath <u>e</u> r	9,1
	25	$e \rightarrow [i] / \#(C)C __ \#$	w <u>e</u> , sh <u>e</u>	3,1
	26	$e \rightarrow [i] / __ -V$	creat <u>e</u> , me <u>w</u>	25,2
	27*:	$e \rightarrow [e] / __ C \text{ity}$	prosper <u>i</u> ty	24,4

¹⁰ Not taught explicitly as a correspondence rule.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
E	28 ^a	$e \rightarrow [i] / _C \begin{cases} ic \\ id \\ ish \\ it \end{cases}$	re <u>l</u> ic, che <u>r</u> ish cre <u>d</u> it	24,3
	32	$e \rightarrow \emptyset$	differe <u>n</u> ce, seve <u>r</u> al	27,6
	38	$e \rightarrow [i] / _x^{vV}(l)V$	cle <u>v</u> er, e <u>x</u> it	25,
I	11	$i \rightarrow [ay] / _Ce$	fi <u>n</u> e, li <u>k</u> e	6,1
	12	$i \rightarrow [ay] / _C\{r\}e\#$	ti <u>t</u> le, i <u>d</u> le	25,4
	13	$i \rightarrow [ay] / _CV$	pi <u>l</u> ot, ci <u>d</u> er	18,1
	14	$i \rightarrow [ay] / _C\{r\}V$	mi <u>g</u> rate, i <u>d</u> ly	25,5
	15	$i \rightarrow [i] / _C(C)\#$	si <u>t</u> , mi <u>l</u> k	1,1
	16	$i \rightarrow [i] / _CC....$	hi <u>dd</u> en, li <u>tt</u> le	8,2
	17	$i \rightarrow [u], [i] \text{ in unstressed syllables}$	mi <u>ss</u> ile, offi <u>c</u> e	10,1
	21	$i \rightarrow [u] / _r^{rC}\#$	bi <u>r</u> d, si <u>r</u>	3,1
	22	$i \rightarrow [ay] / _ \begin{cases} nd \\ ld \\ gn \end{cases} \#$	fi <u>nd</u> , wi <u>ld</u> , si <u>gn</u>	13,3
	24	$i \rightarrow [ay] / _gh$	hi <u>gh</u> , ri <u>gh</u> t	19,2
	25	$i \rightarrow [y] / C_VC$	mi <u>ll</u> ion, on <u>i</u> on	23,2
	26	$i \rightarrow [ay] / _ -V$	li <u>a</u> r, di <u>e</u> t	25,2
	27 ^b	$i \rightarrow [i] / _C \text{ity}$	hu <u>m</u> idity, cap <u>t</u> ivity	24,4
	28 ^a	$i \rightarrow [i] / _C \begin{cases} ic \\ id \\ ish \\ it \end{cases}$	cli <u>n</u> ic, ti <u>m</u> id, fi <u>n</u> ish, li <u>m</u> it	24,3

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
I	32	$i \rightarrow \emptyset$	aspir <u>i</u> n	27,6
	35*	$i \rightarrow [i]$	police, ski	23,2
	36*	$i \rightarrow [i] / __ -V$	radio, period	25,3
	38	$i \rightarrow [i] / __ \left\{ \begin{smallmatrix} V \\ x(l)V \end{smallmatrix} \right\}$	civ <u>i</u> c, riv <u>e</u> r	24,2
O	11	$o \rightarrow [o] / __ Ce\#$	h <u>o</u> me, sm <u>o</u> ke	6,2
	12	$o \rightarrow [o] / __ C \left\{ \begin{smallmatrix} r \\ l \end{smallmatrix} \right\} e\#$	og <u>r</u> e, nob <u>l</u> e	25,4
	13	$o \rightarrow [o] / __ CV$	not <u>i</u> ce, od <u>o</u> r	18,1
	14	$o \rightarrow [o] / __ C \left\{ \begin{smallmatrix} r \\ l \end{smallmatrix} \right\} V$	ok <u>r</u> a, on <u>l</u> y	25,5
	15	$o \rightarrow [a] / __ C(C)\#$	l <u>o</u> t, l <u>o</u> ck	1,6
	16	$o \rightarrow [a] / __ CC....$	mot <u>o</u> , hock <u>e</u> y	8,2
	17	$o \rightarrow [ə], [ɪ] \text{ in unstressed syllables}$	cotton, sail <u>o</u> r	10,1
	21	$o \rightarrow [ɔ], [ɒ], [a] / __ r$	h <u>o</u> rn, tort <u>o</u> ise	9,1
	22	$o \rightarrow [ə] / w __ rC$	word, worth	9,3
	23	$o \rightarrow [o] / __ lC\#$	roll, gold, yolk, bolt	13,2
	24	$o \rightarrow [ɔ], [a] / __ \left\{ \begin{smallmatrix} fC \\ ng \\ ss \\ st \\ th \\ g\# \end{smallmatrix} \right\}$	off, soften, song, moss, lost, moth, dog	13,3
	25	$o \rightarrow [o] / __ \#$	go, motto	18,4
	26	$o \rightarrow [o] / __ -V$	po <u>o</u> m	25,2
	28*	$o \rightarrow [a] / __ C \left\{ \begin{smallmatrix} ic \\ id \\ ish \\ it \end{smallmatrix} \right\}$	phonics, solid, abolish, profit	24,3

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
O	31	$o \rightarrow [ə]$	w <u>o</u> n, m <u>o</u> th <u>e</u> r, s <u>o</u> m <u>e</u> , f <u>o</u> v <u>e</u>	13,1
	32	$o \rightarrow \emptyset$	soph <u>o</u> more, lic <u>o</u> rice	27,6
	38	$o \rightarrow [a] / _\{ \overset{VV}{x}(l)V \}$	nov <u>e</u> l, ox <u>e</u> n	24,2
U	11	$u \rightarrow [(y)u] / _\text{Ce}\#$	<u>u</u> se, crud <u>e</u>	6,2
	12	$u \rightarrow [(y)u] / _\text{C}\{ \overset{r}{l} \} e\#$	bug <u>l</u> e	25,4
	13	$u \rightarrow [(y)u] / _\text{CV}$	<u>u</u> n <u>i</u> t, crus <u>a</u> d <u>e</u>	18,1
	14	$u \rightarrow [(y)u] / _\text{C}\{ \overset{r}{l} \} V$	bug <u>l</u> er	25,5
	15	$u \rightarrow [ə] / _\text{C(C)}\#$	g <u>u</u> m, f <u>u</u> ss	1,6
	16	$u \rightarrow [ə] / _\text{CC} \dots$	sudd <u>e</u> n, just <u>i</u> ce.	8,2
	17	$u \rightarrow [ə], [ɪ]$ in unstressed syllables	lett <u>u</u> ce, min <u>u</u> te	10,1
	20	$u \rightarrow \emptyset / \#g_\text{V}$	g <u>u</u> est, g <u>u</u> ard	19,6
	21	$u \rightarrow [ə] / _\text{r}$	f <u>u</u> r, burn	9,1
	26	$u \rightarrow [(y)u] / _\text{-V}$	flu <u>u</u> d, ru <u>u</u> n	25,6
	31	$u \rightarrow [u]$	bu <u>u</u> ll, pu <u>u</u> sh, pu <u>u</u> t	13,1
	32	$u \rightarrow \emptyset$	natur <u>u</u> l	27,6
Y	11	$y \rightarrow [ay] / _\text{Ce}\#$	rh <u>y</u> me, t <u>y</u> pe	23,3
	12	$y \rightarrow [ay] / _\text{C}\{ \overset{r}{l} \} e\#$	cy <u>l</u> e	25,4
	13	$y \rightarrow [ay] / _\text{CV}$	ty <u>r</u> ant, pap <u>y</u> rus	23,3
	14	$y \rightarrow [ay] / _\text{C}\{ \overset{r}{l} \} V$	cy <u>l</u> one, hydr <u>a</u> nt	25,5
	15	$y \rightarrow [ɪ] / _\text{C(C)}\#$	my <u>th</u> , gym	23,3

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
Y	16	y → [ɪ] / __CC...	system, gypsy	23,3
	17	y → [i], [ɪ] / __# in unstressed syllables	baby, candy	10,2
	19	y → [aɪ] / __# in stressed syllables	deny, try	3,2
	26*	y → [aɪ] / __-V	hyena	25,2
	28*	y → [ɪ] / __C $\begin{cases} ic \\ id \\ ish \\ it \end{cases}$	physic	24,3
	36*	y → [ɪ] / __-V	Tokyo	25,3

Spelling-to-sound correspondences for secondary vowels

AI	10	ai → [e]	stain, rain	16,1
	17	ai → [ə], [ɪ] in unstressed syllables	captain, villain	26,3
AU	10	au → [ɔ]	cause, author	16,4
AW	10	aw → [ɔ]	saw, hawk	6,4
AY	10	ay → [e]	day, play	12,1
EA	11	ea → [ɪ]	each, heat	12,2
	31	ea → [ɛ]	bread, deaf, heaven	12,2
	33	ea → [ə] / __r	earn, search	26,4
EE	10	ee → [i]	beet, feel	3,1
EI	10	ei → [i]	receive, ceiling	26,5
	20	ei → [e] / __ $\begin{cases} gn \\ n \\ gh \end{cases}$	reign, rein, neighbor	26,6

<u>Grapheme Unit</u>	<u>Rule</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
EW	10	ew → [(y)u]	<u>few</u> , <u>new</u>	16,6
EY	10	ey → [e]	<u>they</u> , <u>obey</u>	26,6
	17	ey → [ɪ] in unstressed syllables	<u>donkey</u> , <u>money</u>	26,2
IE	11	ie → [aɪ] / __#	<u>die</u> , <u>lie</u>	19,2
	12	ie → [i] / __....	<u>field</u> , <u>grief</u>	27,5
	17	ie → [ɪ] / __# in unstressed syllables	<u>collie</u> , <u>movie</u>	26,2
OA	10	oa → [o]	<u>load</u> , <u>boat</u>	16,3
OE	10	oe → [o] / __#	<u>hoe</u> , <u>toe</u>	16,3
OI	10	oi → [ɔɪ]	<u>noise</u> , <u>join</u>	16,5
OO	11	oo → [u]	<u>broom</u> , <u>tool</u>	12,3
	12	oo → [ʊ]	<u>book</u> , <u>wood</u>	12,3
OU	10	ou → [aʊ]	<u>count</u> , <u>mountain</u>	16,2
	31	ou → [ʊ]	<u>couple</u> , <u>young</u>	26,7
	33	ou → [(y)u]	<u>through</u> , <u>group</u>	26,7
	34	ou → [ʊ]	<u>fought</u> , <u>thought</u>	26,7
	35	ou → [ɔ]	<u>soul</u> , <u>though</u>	26,7
OW	11	ow → [oʊ]	<u>glow</u> , <u>below</u> , <u>own</u> , <u>bow</u>	12,4
	12	ow → [aʊ]	<u>now</u> , <u>allow</u> , <u>owl</u> , <u>bow</u>	12,4
OY	10	oy → [ɔɪ]	<u>boy</u> , <u>toy</u>	16,5
UE	10	ue → [(y)u]	<u>blue</u> , <u>argue</u>	16,6
UI	10	ui → [(y)u]	<u>fruit</u> , <u>juice</u>	16,6
	31	ui → [ɪ]	<u>build</u> , <u>biscuit</u>	26,8

Spelling-to-sound correspondences for consonants

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
B	10	b → [b]	<u>boy</u> , <u>cub</u> , <u>number</u>	1,5
	20	b → Ø /m__#	<u>climb</u> , <u>comb</u>	19,4
BB	10	bb → [b]	<u>bubble</u> , <u>blubber</u>	1,5 (9,2) ¹¹
C	11	c → [s] / __ { e i y	<u>city</u> , <u>lace</u> , <u>fancy</u>	7,1
	12	c → [k] / __ { a o u C #	<u>cat</u> , <u>come</u> , <u>cut</u> <u>cream</u> , <u>picnic</u> , <u>scare</u>	4,2
CC	11*	cc → [ks] / __ { e i y	<u>accent</u> , <u>succeed</u>	20,4
	12	cc → [k] / __ { a o u	<u>yucca</u> , <u>account</u> , <u>accuse</u>	11,5
CH	10	ch → [ç]	<u>cheap</u> , <u>church</u>	11,2
	31	ch → [k]	<u>ache</u> , <u>school</u> , <u>chord</u> , <u>Christ</u>	20,2
CK	10	ck → [k]	<u>kick</u> , <u>pack</u>	4,2
D	10	d → [d]	<u>dead</u> , <u>needle</u>	1,4
DD	10	dd → [d]	<u>hidden</u> , <u>sudden</u>	1,4
F	10	f → [f]	<u>fat</u> , <u>after</u>	4,1
FF	10	ff → [f]	<u>off</u> , <u>taffy</u>	4,1

¹¹ The unit in parentheses after some double consonant rules indicates the first actual occurrence.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
G	11	$g \rightarrow [j] / \begin{smallmatrix} e \\ i \\ y \end{smallmatrix}$	<u>g</u> em, <u>a</u> ge, <u>g</u> in, <u>g</u> ypsy	7,1
	12	$g \rightarrow [g] / \begin{smallmatrix} a \\ o \\ u \\ c \\ \# \end{smallmatrix}$	<u>g</u> ave, <u>g</u> o, <u>g</u> um, <u>g</u> reen, ba <u>g</u>	4,3
	20*	$g \rightarrow \emptyset / \begin{smallmatrix} \# _n \\ _n\# \end{smallmatrix}$	<u>g</u> naw, si <u>gn</u>	19,3
	31	$g \rightarrow [g]$	<u>g</u> et, <u>g</u> irl	11,6
GG	10	$gg \rightarrow [g]$	e <u>gg</u> , wi <u>gg</u> le	11,5
GH	10	$gh \rightarrow \emptyset$	th <u>ough</u> , ta <u>ugh</u> t, hi <u>gh</u>	19,2
H	10	$h \rightarrow [h]$	<u>h</u> ome, a <u>h</u> ead	1,6
	20	$h \rightarrow \emptyset$	ra <u>h</u> ah, <u>h</u> our	19,2
J	10	$j \rightarrow [j]$	<u>j</u> oy, <u>j</u> udge	4,4
K	10	$k \rightarrow [k]$	mi <u>lk</u> , <u>k</u> ill	4,1
	20	$k \rightarrow \emptyset / \# _n$	<u>k</u> now, <u>k</u> not	19,3
L	10	$l \rightarrow [l]$	<u>l</u> ike, mi <u>l</u> e	1,3
	20	$l \rightarrow \emptyset / \begin{smallmatrix} o _k \\ a _f \\ a _k \\ a _m \\ a _v \end{smallmatrix}$	yol <u>k</u> , fol <u>k</u> , hal <u>f</u> , cal <u>f</u> , val <u>k</u> , stal <u>k</u> , pal <u>m</u> , cal <u>m</u> , cal <u>v</u> es, sal <u>v</u> e	19,5
LE	22	$le \rightarrow [əl] / C _ \#$	<u>l</u> ittle, stab <u>le</u>	10,2
LL	10	$ll \rightarrow [l]$	bul <u>l</u> et, fi <u>ll</u>	1,3
M	10	$m \rightarrow [m]$	<u>m</u> an, ca <u>m</u> e	1,5
MM	10	$mm \rightarrow [m]$	su <u>mm</u> er, ma <u>mm</u> al	1,5 (9,2)
N	10	$n \rightarrow [n]$	<u>n</u> o, <u>n</u> ine, fu <u>n</u>	1,1

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
N	20	$n \rightarrow [ŋ] / \begin{cases} x \\ k \\ qu \\ g \text{ pronounced } [g] \\ c \text{ pronounced } [k] \end{cases}$	anxious, thank, sink, banquet, single, fungus, finger, Lincoln	4,1
NG	10	$ng \rightarrow [ŋ] / _\#$	ring, song	5,5
NN	10	$nn \rightarrow [n]$	inner, funny	1,1
P	10	$p \rightarrow [p]$	people, pop	1,2
PP	10	$pp \rightarrow [p]$	pepper, apple	1,2 (9,2)
PH	10	$ph \rightarrow [t]$	phone, photo	20,2
QU	10	$qu \rightarrow [kw]$	quick, banquet	11,4
R	10	$r \rightarrow [r]$	run, far	1,6
RR	10	$rr \rightarrow [r]$	hurry, marriage	1,6 (9,1)
S	10	$s \rightarrow [s]$	sun, fast, horse	1,3
	20	$s \rightarrow [z] / V_V$	nose, easy	18,2
	21	$s \rightarrow [s] / \begin{cases} ou \\ oo \\ ea \\ a \end{cases} _\#$	house, moose, lease, case	18,2
	31	$s \rightarrow [z] / _\#$	trousers, wives, --- riches	
SH	10	$sh \rightarrow [ʃ]$	shoe, rush	2,1
SS	10	$ss \rightarrow [s]$	mess, missile	1,3

¹Not explicitly taught as a correspondence rule.

<u>Grapheme Unit</u>	<u>Rule #</u>	<u>Rule Description</u>	<u>Examples</u>	<u>Position in sequence</u>
T	10	t → [t]	<u>title</u> , <u>let</u>	2,1
	20	t → Ø / (s__le#) s__en# f__en	w <u>restle</u> , fa <u>st</u> <u>en</u> , o <u>ft</u> <u>en</u>	19,5
TCH	10	tch → [tʃ]	<u>match</u> , <u>notch</u>	11,2
TH	11	th → [θ]	<u>thin</u> , <u>bath</u>	2,2
	12	th → [ð] / (e__er __ern	<u>bathe</u> , <u>father</u> , <u>north</u> <u>ern</u>	20,3
	13	th → [ð] in pronouns, conjunctions, and function words.	<u>they</u> , <u>alth</u> <u>ough</u> , <u>the</u>	2,1
TT	10	tt → [t]	<u>little</u> , <u>mitt</u>	1,1 (9,2)
V	10	v → [v]	<u>vase</u> , <u>love</u>	4,5
W	10	w → [w]	<u>wet</u> , <u>bew</u> <u>are</u>	4,1
	20	w → Ø / #__r	<u>w</u> n, <u>w</u> rong	19,3
WH	10	wh → [hw] or [w]	<u>when</u> , <u>wh</u> <u>ether</u>	11,2
X	10	x → [ks]	<u>box</u> , <u>ox</u> <u>en</u>	4,4
Y	10	y → [j]	<u>y</u> <u>et</u> , <u>bey</u> <u>ond</u>	4,4
Z	10	z → [z]	<u>zoo</u> , <u>laz</u> <u>y</u>	4,5
ZZ	10	zz → [z]	<u>buzz</u> , <u>fuzz</u> <u>y</u>	4,5 (10,1)

APPENDIX D

ALPHABETICAL LIST OF RULES AND PRONUNCIATIONS

Graph-eme Unit	Rule Number	Pronun- ciation	Position in sequence	Graph-eme Unit	Rule Number	Pronun- ciation	Position in sequence
A	11	[e]	6,1	CK	10	[k]	4,2
	12	[e]	25,4		D	10	[d]
	13	[e]	18,1	DD		10	[d]
	14	[e]	25,5		E	11	[i]
	15	[æ]	1,1	13		[i]	18,1
	16	[æ]	8,2	14		[i]	25,5
	17	[ə], [ɪ]	10,1	15		[ɪ]	1,4
	21	[a]	9,1	16		[ɛ]	8,2
	22	[ɛ], [æ]	18,3	17		[ə], [ɪ]	10,1
	23	[ɔ]	13,2	18		∅	6,1
	24	[a], [ɔ]	23,1	21		[ə]	9,1
	25	[o]	9,3	25		[i]	3,1
	26	[e]	25,2	26		[i]	25,2
	27	[æ]	24,4	27		[ɛ]	24,4
	28	[æ]	24,3	28		[ɛ]	24,3
	29	[ɛ]	23,1	32		∅	27,6
	32	∅	27,6	38		[ɛ]	25,2
	38	[ɔ]	24,2	EA	11	[i]	12,2
AI	10	[ə]	16,1		31	[ɛ]	12,2
	17	[ɔ], [ɪ]	26,3		33	[ə]	26,4
AU	10	[ɔ]	16,4	EE	10	[i]	3,1
AW	10	[ɔ]	16,4		EI	10	[i]
Ar	10	[e]	12,1	20		[e]	26,6
B	10	[b]	1,5	EW	10	[(y)u]	16,6
	20	∅	19,4		EY	10	[e]
BB	10	[b]	1,5	17		[i]	26,2
C	11	[s]	7,1	F	10	[f]	4,1
	12	[k]	4,2		FF	10	[f]
CC	11	[fɪs]	20,4	G		11	[j]
	12	[f]	11,5		12	[g]	4,3
CH	10	[tʃ]	11,2		20	∅	19,3
	31	[f]	20,2		31	[g]	11,6

Grapheme Unit	Rule Number	Pronunciation	Position in sequence	Grapheme Unit	Rule Number	Pronunciation	Position in sequence
GG	10	[g]	11,5	NG	10	[ŋ]	5,5
GH	10	∅	19,2	NN	10	[n]	1,1
H	10	[h]	1,6	O	11	[o]	6,2
	20	∅	19,2		12	[o]	25,4
I	11	[ay]	6,1		13	[o]	18,1
	12	[ay]	25,4		14	[o]	25,5
	13	[ay]	18,1		15	[a]	1,6
	14	[ay]	25,5		16	[a]	8,2
	15	[i]	1,1		17	[ə], [ɪ]	10,1
	16	[i]	8,2		21	[o], [ɔ], [a]	9,1
	17	[ə], [ɪ]	10,1		22	[ə]	9,3
	21	[ə]	9,1		23	[o]	13,2
	22	[ay]	13,3		24	[ɔ], [a]	13,3
	24	[ay]	19,2		25	[u]	18,4
	25	[y]	23,2		26	[o]	25,2
	26	[ay]	25,2		28	[a]	24,3
	27	[i]	24,4		31	[ə]	13,1
	28	[i]	24,3		32	∅	27,6
	32	∅	27,6		38	[a]	24,2
	35	[i]	23,2	OA	10	[o]	16,3
	36	[i]	25,3	OE	10	[o]	16,3
	38	[i]	24,2	OI	10	[oy]	16,5
IE	11	[ay]	19,2	OO	11	[u]	12,3
	12	[i]	26,5		12	[u]	12,3
	17	[i]	26,2	OU	10	[aw]	16,2
J	10	[j]	4,4		31	[ə]	26,7
K	10	[k]	4,1		33	[(y)u]	26,7
	20	∅	19,3		34	[o]	26,7
L	10	[l]	1,3		35	[o]	26,7
	20	∅	19,5	OW	11	[o]	12,4
LE	22	[ɔɪ]	10,2		12	[aw]	12,4
LL	10	[l]	1,3	OY	10	[oy]	16,5
M	10	[m]	1,5	P	10	[p]	1,2
MM	10	[m]	1,5	PH	10	[f]	20,2
N	10	[n]	5,5	PP	10	[p]	1,2
	20	[ŋ]	4,1				

Grapheme Unit	Rule Number	Pronunciation	Position in sequence	Grapheme Unit	Rule Number	Pronunciation	Position in sequence
QU	10	[kw]	11,4	WH	10	[hw], [w]	11,3
R	10	[r]	1,6	X	10	[ks]	4,4
RR	10	[r]	1,6	Y	10	[y]	4,4
S	10	[s]	1,3		11	[ay]	23,3
	20	[z]	18,2		12	[ay]	25,4
	21	[s]	18,2		13	[ay]	23,3
SH	10	[ʃ]	2,1		14	[ay]	25,5
SS	10	[s]	1,3		15	[ɪ]	23,3
T	10	[t]	1,1		16	[ɪ]	23,3
	20	∅	19,5		17	[i], [ɪ]	10,2
TCH	10	[tʃ]	11,2		19	[ay]	3,2
TH	11	[θ]	2,2		26	[ay]	25,2
	12	[ð]	20,3		28	[ɪ]	24,3
	13	[ð]	2,1		36	[i]	25,3
TT	10	[t]	1,1	Z	10	[z]	4,5
U	11	[(y)u]	6,2	ZZ	10	[z]	4,5
	12	[(y)u]	25,4				
	13	[(y)u]	18,1				
	14	[(y)u]	25,5				
	15	[ə]	1,6				
	16	[ə]	8,2				
	17	[ə], [ɪ]	10,1				
	20	∅	19,6				
	21	[ə]	9,1				
	26	[(y)u]	25,6				
	31	[u]	13,1				
	32	∅	27,6				
UE	10	[(y)u]	16,6				
UI	10	[(y)u]	16,6				
	31	[ɪ]	28,8				
V	10	[v]	4,5				
W	10	[w]	4,1				
	20	∅	19,3				

APPENDIX E



SOUTHWEST REGIONAL LABORATORY
DEVELOPMENT MEMORANDUM

DM9

DATE

April 17, 1969

RELEASE

Howard J. Sullivan *HS*

CONTENT AND SEQUENCE FOR BLOCK I OF THE 1970 READING PROGRAM
Betty Berdiansky and George Stanton

Previous work has led to identification of an extensive lexicon upon which the SWRL 1970 primary-grade reading program will be based, as well as to the development of a considerable number of sound-symbol correspondence rules (see Berdiansky, Cronnell, and Koehler, 1969). The present document describes the initial steps taken in the development of a complete sequencing of these rules. This sequencing procedure is being based, in general, on the Desberg and Cronnell (1969) analysis of the characteristics of the rules. For the first block of this sequence, the rules were ordered primarily on the basis of their combined productivity, i.e., the number of words from the given lexicon which can be generated by the given combination of rules. The sequencing of rules and the listing of resultant useable words is covered in this report for the first block of rules only. Within- and across-block sequencing has not yet been entirely completed.

The Desberg and Cronnell paper categorizes grapheme-phoneme rules of correspondence into 17 sequenced blocks according to classification and sequencing rationales described by the authors of the paper. These rationales will not be discussed in this report at any greater length than is necessary to indicate the reasoning behind specific modifications of the Desberg and Cronnell sequence. Following are the steps gone through by the staff in their decisions on rule sequencing.

Step 1. The Desberg and Cronnell paper combined consonant rules, primary vowel rules, and secondary vowel rules into homogeneous groupings (Blocks). The Block I consonant rules: S10, N10, M10, R10, L10, T10, D10, P10, B10, and the Block I primary vowel rules: I15, A15, E15, U15, O15, (the "short vowels") were selected and assigned to initial blocks because of their high frequency and regularity. The initial block of the secondary vowel rules consisted only of Rule EE10. It was designated to Block I because it was the most regular secondary vowel rule, although the second most frequent. In the earliest stages of this program, rule regularity was seen as more crucial than rule frequency.

Step 2. The Rule 15 printout for each vowel and the Rule EE10 printout were consulted, and those words which were composed of only those vowels and consonants comprising Block I were listed. Also, the "40-words" sub-group ("40 words" are words containing at least one irregular grapheme - phoneme correspondence) for each of these regular vowel rules was examined, and a separate list was made of words containing a Block I grapheme's 40 rule in addition to the regular Block I rules. Then the I40, A40, E40, U40, O40, and EE40 printouts were consulted, and words containing the assigned consonants and vowels operating under Block I regular or 40 rules were listed. Only the vowel-rule

printouts had to be consulted, since they included all the words which would have been in any of the consonant-rule printouts. Given below is an example of the format used for listing the words selected from the printouts:

	<u>A15</u>		<u>A40</u>
non-40s	40s	<u>1 syl.</u>	<u>2 syl.</u>
<u>1 syl.</u>	<u>2 syl.</u>	<u>1 syl.</u>	<u>2 syl.</u>

Step 3. For each vowel-rule, a cumulative chart was constructed, (i.e., each word entry occurs as soon as all component letters of the word are listed, but not before). This chart used the Desberg and Cronnell consonant Block I sequence: S, N, M, R, L, T, D, P, B; which was based on the idea that, since continuants blend easier than stops, it would be best to use them at the outset of instruction. The chart showed the order of occurrence of these words which could be taught from the Block I vowel and Block I consonant rules. It also showed the rules prerequisite to teaching a given word, provided the rules were taught in this order. For example, for the primary vowel Rule 015, the cumulative list of possible words from the consonant-10 rules S, N, M, R, L, and T was as follows:

<u>non 40s</u>	<u>40s</u>	<u>040s</u>
1 syl. 2 syl.	1 syl. 2 syl.	1 syl. 2 syl.
S		
N		
M mom		
R		
L		sol
T lot, not rot, slot tot, trot	tom-tom	

Step 4. When charts for all vowel-15 rules, with the consonants ordered S, N and so forth, were inspected, the resulting words-per-rule ratio was quite low in the early steps of the sequence. As a first step in leading to the construction of a more productive sequence, the number of words in which each of the nine consonants occurred with each of the six vowels was determined. This information would be useful in developing the most productive order of rule introduction, since no cumulative restrictions would be placed on the count of consonant vowel pairs. Therefore, the following list was constructed:

	Total	I15	A15	E15	U15	O15	EE10**
*H10	25	6	4	6	7	2	
S10	112	21	27	24	25	6	9
N10	76	14	22	22	13	5	
M10	64	14	14	10	21	5	
R10	63	12	11	6	20	6	8
L10	86	26	15	22	9	8	6
T10	129	25	33	28	24	15	8
D10	76	12	20	19	6	11	8
P10	113	27	27	15	20	16	8
B10	60	7	16	10	16	7	4
	359	(71)	(80)	(64)	(67)	(40)	(27)

Since the words covered by Block I rules have just one vowel apiece, each word contributed a tally in the appropriate vowel column for each different consonant it contained. For example, the word "smart" would contribute a tally in each of the following four cells of the A15 column: A-S, A-M, A-R, and A-T. Summing across a row gives the number of words in which that consonant occurs,

*The rule H10 was added to Block I, although it was not in the original Desberg and Cronnell sequence, because SH and TH rules are scheduled for Block II. It was felt the Block I should contain, S, T and H rules separately before their introductions as digraphs.

**It was later decided to move the EE10 rule into Block II, although it was included in Block I when this matrix was constructed.

since the words in this group had no more than one vowel. If a word repeated any consonants, only one tally, not two, was given to that particular consonant vowel combination. According to the "total" column of this matrix, the rank order of consonant rules, according to the frequency of their occurrence with all of the vowels in Block I, is: T10, P10, S10, L10, N10, D10, M10, R10, B10, H10. Similarly, the number of words in which each vowel rule occurred was counted. These figures are circled at the bottom of each column. (The circled numbers are not the sums of the columns. The sums would equal the number of times each vowel occurred with every other letter in each word of the lexicon.) The resulting rank order for the vowels was A15, I15, U15, E15, O15 and EE10. When individual cells in the matrix were rank ordered the result was: TA; TE; SA and PA; PI; LI and SU; SE; TI; SI, NA, NE and TU; LE, MU, RU and PU; DA and DE; BA; LA, BU and PO; TO; NI, MI, MA and PE; RI and NU; DI, RA and DO; BE.

Step 5. The most frequent consonants and vowels were then chosen from the consonant-vowel matrix. The rank order of the appearance of these consonants and vowels was also considered, since these two manners of ranking the consonants and vowel in terms of productivity might give different results, hence requiring certain adjustments.

The primary vowel rules A15, I15 and E15 were both the most productive and the highest in rank order of appearance. Therefore, a chart was made which showed for each vowel the number of Block I words which could be formed by that vowel combined with one, two, or three specified Block I

consonants.* (Five-letter combinations--i.e., 4 consonants-1 vowel--were not considered since they were relatively infrequent.)' Charts 1, 2 and 3 give the results of this procedure (See Appendix A). The number following some of the consonant combinations in Charts 1, 2 and 3 indicates the number of words possible using that combination with that chart's vowel.

Step 6. Three more charts were made, based on the data from the first three. These new charts first listed the two-consonant, one-vowel combinations which, according to the first chart for that vowel, were combinable into the largest number of words. These initial combinations were then combined with each of the other most productive consonant rules for that same vowel. Thus, three-consonant, one-vowel combinations were established for all of the most productive consonants for a given vowel. (See Charts 4, 5 and 6 in Appendix A).

Step 7. The words for the most productive two-consonant, one-vowel combinations were listed and compared. They were:

N10, T10, A15 - ant, tan, at, an
L10, T10, I15 - ill, it, lit, till
N10, P10, I15 - nip, in, inn, pin

It had been decided, on the basis of efficiency in maximizing productivity at this early stage, to include two vowels in the first unit. Thus, each of the above lists were expanded to include both A15 and I15, and the

*At this point, it should be noted, that, for various reasons -- the most common being low anticipated utility--the following words were deleted from those under consideration: sep hell hemp pent rend
smelt apt ass ban blab brad brat rat-tat tam tat lust rum pun
rum rump sup trump dill din lisp pip primp spit. These deletions did not, however, affect the positions of A10, I10 and E10 as the most productive primary vowel rules.

following lists were compared:

N10, T10, A15, I15 - tin, tint, ant, tan, at, an, in, inn, it
L10, T10, A15, I15 - ill, at, it, till, lit
N10, P10, A15, I15 - an, in, inn, nap, pan, pin, nip

The combinations of N10, T10, A15 and I15, within this lexicon, proved to be the most productive and were therefore designated as Unit 1.

Step 8. For Unit 2, the most productive remaining consonant rules: S10, P10, L10 and D10 were each considered in combination with Unit 1. The following word lists resulted:

S10 - sat, sin, sit, its
P10 - pan, nap, pat, tap, pant, pit, tip, pin, nip
L10 - lit, ill, till, lint
D10 - and, did

Thus, P10 was designated as Unit 2.

Step 9. For Unit 3, vowel Rule E15 and the remaining most productive consonant rules (L10, S10 and D10) were considered. The most productive pair was sought. This was, by far, L10 and S10. This pair, when combined with N10, T10, P10, A15 and I15, yielded 40 new words. D10 and E15 then became Unit 4.

Step 10. The remaining rules (M10, B10, H10, R10, O15 and U15) needed to be combined in a reasonable way for Units 5 and 6. The rules M10, B10, and U15 were designated Unit 5, the others as Unit 6. This resulted in a rather even split of the block's remaining words, with Unit 6 containing a few more than Unit 5. The final organization of rules and word exemplars for Block 1 is presented in Appendix B.

APPENDIX A

FREQUENCY COUNTS FOR BLOCK I RULES IN COMBINATION

Chart 1: Consonant - combination frequencies
for 115 words in Block I

T: 1	S	P	L: 1	N: 2	B: 1	D: 1	M	H	R
TS: 1	ST: 1	PT: 2	LT: 2	NT	BT: 1	DT	MT: 1	HT: 1	RT
TP	SP: 1	PS	LS: 1	NS	BS	DS	MS: 1	HS	RS
TL	SL	PL	LP: 2	NP: 2	BP	DP: 1	MP: 1	HP: 1	RP: 1
TN: 2	SN: 1	PN	LN	NL	BL: 1	DL	ML	HL: 1	RL
TB	SB	PB	LB	NB	BN: 1	DN	MN	HN	RN
TD	SD	PD	LD: 1	ND	BD: 1	DB	MB	HB	RB: 1
TM	SM	PM	LM: 1	NM	BM	DM: 1	MD	HD: 1	RD: 1
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM: 1
TR	SR	PR	LR	NR	BR	DR	MR	HR	RH
TRL: 1	SLD: 1	PRM: 1	IMP: 1		BLS: 1	DRL: 1	MST: 1	HNT: 1	
TRM: 1	SIM: 1		LNT: 1						
	SLP: 2		IST: 3						
TRP: 1	SNP: 2								

Chart 2: Consonant - combination frequencies
for 15 words in Block I

T: 1	S	P	L	N: 1	B	D: 2	M: 1	H	R
TS	ST: 1	PT: 2	LT	NT	BT: 2	DT	MT: 1	HT: 1	RT: 1
TP	SP	PS: 2	LS: 1	NS	BS: 1	DS	MS: 1	HS	RS
TL	SL	PL	LP: 2	NP: 2	BP	DP	MP: 1	HP	RP: 1
TN: 2	SN	PN	LN	NL	BL	DL	ML	HL	RL
TB	SB	PB	LB	NB:	BN	DN	MN: 1	HN	RN: 1
TD	SD: 1	PD: 1	LD: 1	ND: 1	BD: 1	DB: 1	MB	HB	RB
TM	SM	PM	LM	NM	BM	DM: 2	MD	HD: 1	RD
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM: 1
TR	SR	PR	LR	NR	BR	DR	MR	HR	RH
—	—	—	—	—	—	—	—	—	—
TRP: 1	SND: 1	PNT: 1	LMP: 1		BND: 1	DMP: 1	MST: 1	HND: 1	
	SLB: 1	PST: 3	LND: 1		BRN: 1				
	SIM: 1	PLN: 1	LST: 1		BRS: 1				
	SLP: 1								
	SNP: 2								
	STB: 1								

Chart 3: Consonant - combination frequencies
for E15 words in Block I

T	S	P: 1	L	N	B	B	M	H	R
TS	ST: 2	PT: 1	LT: 2	NT: 3	BT: 1	DT	MT: 1	HT	RT
TP	SP	PS	LS: 1	NS	ES	DS	MS: 1	HS	RS
TL	SL	PL	LP	NP	BP	DP	MP	HP	BP
TN	SN	NP: 1	LN	NL	BL: 1	DL: 2	ML	HL	RL
TB	SB	PB	LB	NB	BN	DN: 1	MN: 1	HN: 1	RN
TD	SD	PD	LD	ND: 1	BD: 1	DB	MB	HB	RB
TM	SM	PM	LM: 1	NM	BM	DM	MD	HD	RD: 1
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM
TR	SR	PR	LR	NR	BR	DR	MR	HR	RH
	SND: 1	PLT: 1	LND: 1		BLT: 1	DNT: 2	MLT: 1	HLD: 1	RNT: 1
	SNT: 2	PST: 1			BND: 1	DRS: 1	MND: 1	HLF: 1	RST: 1
	SLD: 1	PRS: 1			BNT: 1				
	SML: 1				BST: 1				
	SPD: 1				BLD: 1				
	SPL: 1				BLS: 1				
	STM: 1								

Chart 4: Most frequent two- and three-
letter combinations for 115
words in Block I

CONSONANT COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT- RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
PT	3	S	6
		L	8
LT	4	P	8
		S	10
TN	5	P	9
		S	8
		L	9
LP	3	S	7
		T	8
NP	4	T	9
		S	8
		L	7

Chart 5: Most frequent two- and three-
letter combinations for A15
words in Block I

CONSONANT COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT- RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
PS	2	N	7
		T	9
		L	6
		M	5
		D	6
PT	3	N	9
		S	9
		L	5
		M	6
		D	6
PL	2	N	6
		S	6
		T	5
		M	5
		D	6
PN	3	S	7
		T	9
		M	6
		L	6
		D	7

Chart 5: For A15 - Continued

INITIAL COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
NT	4	S	5
		L	4
		M	7
		D	7
		P	9
<hr/>			
DM	5	N	8
		T	7
		L	6
		P	8
		S	7

Chart 6: Most frequent two- and three-letter combination for 115 words in Block I

INITIAL COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT-RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
TS	2	L	5
		N	6
		D	2
LT	2	S	5
		N	5
		D	4
NT	3	S	7
		L	5
		D	7
DL	2	S	4
		T	4
		N	5

APPENDIX F



SOUTHWEST REGIONAL LABORATORY
TECHNICAL NOTE

DATE August 27, 1970

NO TN 5-70-20

TITLE: WORDLIST

AUTHOR: Richard Angilly and Lanaii Kline

ABSTRACT

WORDLIST sequences a lexicon of words (coded for spelling-to-sound correspondences) in such a way that, with the introduction of each correspondence rule, the words listed by the program contain that rule in combination with previously introduced rules.

WORDLIST

1.0 - PROGRAM IDENTIFICATION

WORDLIST

2.0 - OBJECTIVE

The purpose of the computer program for the 1970 Reading Program was to sequence the lexicon of 6000 words (coded for spelling-to-sound correspondences) in such a way that, with the introduction of each correspondence rule, the words listed by the program would contain that rule in combination with previously introduced rules. In addition, the program provided the following supplemental information:

1. a count of the number of words listed upon the introduction of each rule;
2. a count of the number of words listed for each unit of rules;
3. a count of the number of words listed for each block of units of rules;
4. an alphabetical listing of the non-coded (polysyllabic) words.

This program was run separately for the portion of the lexicon designated as appropriate for the 6-7 age group and again for the lexicon for the 8-9 age group.

An adjunct to the program classified the irregular words in the same manner as the regular words except that the irregular rule(s) within the words were designated as equivalent, for sequencing purposes, to their earliest-appearing regular counterparts (e.g., A40 = A15).

3.0 - PROGRAM DESCRIPTION

3.1 - Program Logic

The program is set up in two parts. The first goes through a list of words from file, ICARD, and checks for the rules associated with that word. If there are no rules, the program stores the word in file, NRLST; otherwise, the program finds the highest rule associated with that word by comparing the rules to the hierarchy of the rules in file, IRULST. The program then determines if the high rule is a forty-rule. If so, the word is stored in file, TABLE, with a flag equal to one; otherwise, the flag is equal to zero. TABLE and NRLST are alphabetically sorted since IRULST is alphabetized. The

second phase of execution determines the words with forty-rules and bypasses them. The remaining words (regular rules) are sorted by rule, and each rule is then sequenced according to the number of words which use that rule. Based on that number, space is created on a random access file. The file is then printed on a PRINT file. The forty-rules are also sequenced according to the number of words using that rule. Space is allocated on a random access file; then the file is printed on PRINT followed by the words in file, NRLST.

3.2 - Variables

- IREG(268) - frequency counter for that rule-name for rule based words.
- IFOR(268) - frequency counter for that rule-name for forty-words.
- IBLK(268) - block number (from 01 to 22).
- IUNT(268) - unit number (associated with the block number).
- ISYLA(268) - syllable duplication indicator
 - (' ' - only occurrence of rule-name)
 - (0 - first occurrence of rule-name; associated with one syllable words)
 - (1 - second occurrence of rule-name; associated with word having emphasis on its first syllable)
 - (2 - third (last) occurrence of rule-name; associated with word having emphasis on its second syllable)
- IRULSTZ(268) - individual rule-name (arranged hierarchially 1 to 220) (two special rule-names:
 - 'E7980' - if 'E' indicator present in col. 79 or 80 of input)
 - 'FORTY' - for words having only '40' rule-names)
- IWORD - the word up to and including 16 characters.
- IRULES - rule-names associated with the word (3, 4, or 5 characters in length; separated by a comma)
- ISYLL - syllable notation
 - ' ' - no rule words
 - 0 - one-syllable words
 - 1, 3, 4 - more than one syllable having stress on first syllable.
 - 2 - more than one syllable having stress on second syllable.
- 179E and 180E - special indicators (' ' and E)
 - (E implies highest rule-name associated with that word would be rule-name 'E7980' concerning words having special 'E' endings)
- HIRULE - highest rule-name associated with that word
- HI - hierarchial number associated with that rule name (1 to 220)
- LONG - indicator: IZERO = 0 = rule-based words
 IZERO LONG = 1 = forty-words

4.0 - SUBROUTINES AND FUNCTIONS

REPOSITION - repositions records on disk. An ITS library routine.

5.0 - DATA SPECIFICATIONS

5.1 - Input Formats

File:	IRULST	variable	format
	Col 1	INK(268)	A1
	Col 2-6	IRULSTZ(5,268)	5A1
	Col 7	ISYLA(268)	A1
	Col 8-9	IBLK(268)	12
	Col 10	IUNT(268)	I1
	Col 11-13	IREG(268)	13
	Col 14-16	IFOR(268)	13
File:	ICARD		
	Col 3-18	IWORD(4)	4A4
	Col 19-68	IRULES(50)	50A1
	Col 69	ISYLL	I1
	Col 79-80	179E and 180E	2A1

5.2 - Output Formats

File:	TABLE	variable	format
	Col 1	LONE or IZERO	I1
	Col 2-17	IWORD(4)	4A4
	Col 18-22	HIRULE(5)	5A1
	Col 23-25	HI	13
File:	IRULST		
	Col 1-16	IWORD(4)	4A4
File:	RULST		
	Col 1-5	IRULSTZ(5,268)	5A1
	Col 6	ISYLA(268)	A1
	Col 7-8	IBLK(268)	12
	Col 9	IUNT(268)	I1
	Col 10-12	IREG(268)	13
	Col 13-15	IFOR(268)	13
File:	IRDLST		
	Col 1-4	L or NUM	14
	Col 5-20	WORD(4)	4A4
	Col 21-25	HIRULE(5)	5A1
	Col 26-28	HI	13

6.0 - PROGRAM CONSTRAINTS AND LIMITATIONS

6.1 - Language

FORTRAN II

6.2 - Vendor

International Time Sharing Corporation

6.3 - Storage Requirements
Random Access Disk

6.4 - Hardware Configuration
CDC 3300

6.5 - Program Parameters
The current maximum array size is 268. This number corresponds to the total number of rules. To expand the rules the user must be sure to change the dimensions of those affected variables and to change those do-loops which fall under the influence of the number of rules used.

6.6 - Error Messages
The program prints out a list of errors in the rules, but will continue execution.

The program also types messages relating to the point in execution at which the program is currently located.

6.7 - Additional Information
An update program, CORRECT, works in conjunction with WORDLIST. See the documentation for CORRECT for further details.

7.0 - OPERATING INSTRUCTIONS

The program execution mode is via interactive operation through operator interaction at a console. The following is printed on the console as feed-back relating to the execution of the program.

"START OF EXECUTION"
"SECOND PASS BEGUN"
"WRDLST OPEN"
"WRDLST1 OPEN"
"NRLST OPEN"
"PROGRAM COMPLETED"

See Attachment 1 for sample data and Attachment 2 for sample run.

All output files (NRLST and TABLE) must be deleted manually. In order to get a printed output from the file, PRINT, the user must inform the operator to print the file and give him mailing instructions.

8.0 - FLOWCHART

Available upon request.

```

PROGRAM WORDLIST
C   CREATES A WORDLIST (CORRESPONDING TO THE HIGHEST RULE-NAME)
C   FOR RULE-BASED-WORDS AND FORTY-WORDS.
    INTEGER HIRULE,HI
    DIMENSION INK(268),IRULSTZ(5,268)      A(268),IBLK(268),IUNT(268),
    IIREG(268),IFOR(268),IPOINT(268),      K(4),IRULES(50),IRULE(5),
    2HIRULE(5)
    LONE=1
    IZER0=0
    NRT0T=0000
    TYPE,"START OF EXECUTION"
    OPEN(2),INPUT,IRULST
    DO 10 I=1,268
        READ(2,1),INK(I),(IRULSTZ(N,I),N=1,5),ISYLA(I),IBLK(I),IUNT(I),
        1 IIREG(I),IFOR(I)
        FORMAT(A1,5A1,A1,I2,I1,2I3)
    10 CONTINUE
        TYPE,"IRULST INPUT"
        CLOSE(2)
        OPEN(2),INPUT,ICARD
        OPEN(3),OUTPUT,TABLE
        OPEN(4),OUTPUT,NRLST
        WRITE(1,6)
    6  FORMAT(25X,"ERROR LIST",/)
    2  READ(2,4),(IWORD(N),N=1,4),(IRULES(M),M=1,50),ISYLL,I79E,I80E
    4  FORMAT(2X,4A4,50A1,I1,9X,2A1)
        IF END RECORD 2,500
        J=1
        K=1
        IEND=0
        IFORTY=0
        DO 5 M=1,5
            IRULE(M)=" "
            HIRULE(M)=" "
    5  CONTINUE
            HI=000
    8  IF(IRULES(J)-" ")15,20,15
    20 IF(IRULES(J+1)-" ")18,21,18
    21 IF(HI)80,22,80
    22 IF(J-4)24,80,80
    24 WRITE(4,16),(IWORD(N),N=1,4)
    16 FORMAT(4A4)
        NRT0T=NRT0T+1
        GO TO 2
    15 IF(IRULES(J)-",")18,23,18
    23 J=J+1
    19 DO 29 K=1,5
        IF(IRULE(K)-"4")29,33,29
    33 IF(IRULE(K+1)-"0")70,30,70
    30 IFORTY=1
        K=1
        GO TO 70

```

```

29  CONTINUE
    GO TO 70
18  IRULE(K)=IRULES(J)
    K=K+1
    J=J+1
    GO TO 8
70  DO 71 I=1,268
    DO 50 M=1,5
    IF(IRULE(M)-IRULSTZ(M,I))71,50,71
50  CONTINUE
73  IF(ISYLA(I)-" ")74,75,74
75  IF(HI)76,77,76
76  IF(HI-1)77,77,78
77  DO 56 M=1,5
    HIRULE(M)=IRULE(M)
56  CONTINUE
    HI=I
78  K=1
    DO 57 M=1,5
    IRULE(M)=" "
57  CONTINUE
    IF(IEND-1)8,79,8
79  IEND=0
    GO TO 80
74  IF(ISYLL)105,100,105
105  GO TO (101,102,101,101),ISYLL
100  IF(ISYLA(I)-"0")71,75,71
101  IF(ISYLA(I)-"1")63,75,63
63  IF(ISYLA(I)-"3")64,75,64
64  IF(ISYLA(I)-"4")71,75,71
102  IF(ISYLA(I)-"2")71,75,71
71  CONTINUE
    GO TO 110
80  DO 58 M=1,5
    IF(IRULE(M)-" ")81,58,81
58  CONTINUE
82  IF(I79E-"E")83,84,83
84  DO 59 M=1,5
    HIRULE(M)=IRULSTZ(M,236)
59  CONTINUE
    HI=236
    GO TO 90
83  IF(I80E-"E")90,84,90
81  IEND=1
    GO TO 19
90  IF(FORTY-1)91,93,110
93  WRITE(3,94),LONE,(IWORD(N),N=1,4),(HIRULE(M),M=1,5),HI
94  FORMAT(11,4A4,5A1,I3)
    I=HI
    IFOR(I)=IFOR(I)+1
    IFORTY=0
    GO TO 2

```



```
91 WRITE(3,95), IZERO, (IWORD(N), N=1, 4), (HIRULE(M), M=1, 5), HI
95 FORMAT(11, 4A4, 5A1, I3)
   I=HI
   IREC(I)=IREG(I)+1
   GO TO 2
110 WRITE(1,115), (IWORD(N), N=1, 4), (IRULES(M), M=1, 50), ISYLL,
   I179E, I80E
115 FORMAT(/, 4A4, 50A1, I1, 2A1)
   WRITE(1,117), (IRULE(M), M=1, 5)
117 FORMAT(3X, "*****ERROR IN RULE ", 5A1, /)
   GO TO 2
500 CLOSE(2)
   OPEN(2), OUTPUT, RULST
   DO 300 I=1, 268
     WRITE(2,310), (IRULSTZ(N, I), N=1, 5), ISYLA(I), IBLK(I), IUNT(I),
     IIREG(I), IFOR(I)
310 FORMAT(5A1, A1, I2, I1, 2I3)
300 CONTINUE
   CLOSE(2)
   OPEN(2), OUTPUT, PRINT
   TYPE, "SECOND PASS BEGUN"
   ISET=0
   CLOSE(4)
   OPEN(4), OUTPUT, WRDLST
505 CLOSE(3)
   OPEN(3), INPUT, TABLE
   IUNIT=0000
   IFLCK=0000
   ITOTAL=0000
   ICNT=0000
   IP0INT(1)=0001
   DO 510 I=2, 269
     IP0INT(I)=IP0INT(I-1)+IREG(I-1)
510 CONTINUE
   LAST=IP0INT(269)-1
   DO 515 L=1, LAST
     WRITE(4, 516), L
516 FORMAT(I4)
     INSERT(4)
515 CONTINUE
520 READ(3, 501), KEY, (IWORD(N), N=1, 4), (HIRULE(M), M=1, 5), HI
501 FORMAT(11, 4A4, 5A1, I3)
   IF END RECORD 3, 525
   IF(ISET-0) 508, 507, 508
507 IF(KEY-0) 520, 503, 520
508 IF(KEY-1) 520, 503, 520
503 J=HI
   SKIP(4), BEGINFILE
   SKIP(4), FORWARD, IP0INT(J)-1, RECORDS
   CALL REPOSITION(4)
   IP0INT(J)=IP0INT(J)+1
   WRITE(4, 506), (IWORD(N), N=1, 4), (HIRULE(M), M=1, 5), HI
```

```
506  FORMAT(4A4,5A1,I3)
      GO TO 520
525  WRITE(2,502)
502  FORMAT(7////,33X,"*****")
      IF(ISET-0)522,521,522
521  WRITE(2,526)
526  FORMAT(33X,"* RULE-BASED-WORDS *")
      TYPE,"WRDLST OPEN"
      GO TO 528
522  WRITE(2,523)
523  FORMAT(33X,"*   FORTY-WORDS   *")
528  WRITE(2,504)
504  FORMAT(33X,"*****",////)
      WRITE(2,561)
561  FORMAT("*****BLOCK 1 *****",/)
      CLOSE(4)
      IF(ISET)511,512,511
512  OPEN(4),INPUT,WRDLST
      GO TO 529
511  OPEN(4),INPUT,WRDLST1
529  I=1
      LINE=0
      IFIN=0
514  READ(4,530),NUM
530  FORMAT(I4)
      READ(4,532),(IWORD(N),N=1,4),(HIRULE(M),M=1,5),HI
532  FORMAT(4A4,5A1,I3)
      SKIP(4),FORWARD,1,RECORDS
      IF END FILE 4,536
      IF(LINE)517,513,517
513  IF(ISET)509,518,509
518  IF(INK(I)-"1")509,517,509
509  WRITE(2,527),(IRULSTZ(N,I),N=1,5),IREG(I)
527  FORMAT(5A1,5X,"FREQUENCY=",I3,/)
      IUNIT=IUNIT+IREG(I)
      IBLCK=IBLCK+IREG(I)
      ITOTAL=ITOTAL+IREG(I)
517  DO 535 M=1,5
      IF(HI-I)531,535,531
535  CONTINUE
      WRITE(2,540),(IWORD(N),N=1,4)
540  FORMAT(7X,4A4,/)
      LINE=1
      GO TO 514
536  IFIN=1
531  IF(IUNIT(I)-IUNIT(I+1))537,550,537
537  WRITE(2,541),IBLK(I),IUNIT(I),IUNIT
541  FORMAT(10X,"BLOCK ",I2,"   UNIT ",I1,5X,"FREQUENCY=",I4,/)
      IF(IBLK(I)-IBLK(I+1))538,539,538
539  IUNIT=0000
      GO TO 550
```

```
538 WRITE(2,542),IBLK(I),IBLOCK
542 FORMAT(10X,"TOTAL BLOCK ",I2,5X,"FREQUENCY=",I4,/)
315 IUNIT=0000
    IBLOCK=0000
    IF(IFIN)552,565,552
565 WRITE(2,566),IBLK(I+1)
566 FORMAT("*****BLOCK ",I2," *****",/)
550 I=I+1
    LINE=0
    GO TO 513
552 IF(IBLK(I)-23)565,575,575
575 WRITE(2,543),ITOTAL
543 FORMAT(///,25X,"#####TOTAL WORDS=",I4," #####",/////)
    IF(ISET-1)551,555,555
551 ISET=1
    DO 560 I=1,268
    IREG(I)=IFOR(I)
560 CONTINUE
    TYPE,"WRDLST1 OPEN"
    CLOSE(4)
    OPEN(4),OUTPUT,WRDLST1
    GO TO 505
555 CLOSE(4)
    OPEN(4),INPUT,NRLST
    TYPE,"NRLST OPEN"
    WRITE(2,572)
572 FORMAT(////,33X,"*****")
    WRITE(2,558)
558 FORMAT(33X,"* WORDS WITH NO RULES *")
    WRITE(2,573)
573 FORMAT(33X,"*****",/////)
557 READ(4,568),(IWORD(M),M=1,4)
568 FORMAT(4A4)
    IF END RECORD 4,581
    WRITE(2,569),(IWORD(M),M=1,4)
569 FORMAT(10X,4A4,/)
    DO 574 M=1,16
    IWORD(M)=" "
574 CONTINUE
    GO TO 557
581 WRITE(2,571),NRTOT
571 FORMAT(25X,"#####TOTAL WORDS=",I4," #####",/////)
    TYPE,"PROGRAM COMPLETED"
    END
```

Attachment 1

IRULST
Database
(Sample Data)

N10	011	E11	0062	U16	2104	S31	153
NN10	011	C11	070	A16	2104	E19	153
T10	011	G11	070	Ø16	2104	S20	154
TT10	011	A15	1081	E16	2104	S21	154
A15	0011	E15	1081	E21	2104	A22	155
I15	0011	I15	1081	I21	2104	UE10	161
P10	012	Ø15	1081	Ø21	2104	IE11	161
PP10	012	U15	1081	A21	2104	ØE10	161
L10	013	A11	1081	A25	2104	AI10	162
LL10	013	E11	1081	Ø22	2104	ØU10	163
S10	013	I11	1081	EE10	2104	ØA10	164
SS10	013	Ø11	1081	Y19	2104	AW10	165
D10	014	U11	1081	A17	2105	AU10	165
DD10	014	EE10	1081	E17	2105	ØI10	166
E15	0014	Y19	1081	Ø17	2105	ØY10	166
M10	015	A16	1082	U17	2105	EW10	167
MM10	015	I16	1082	I17	2105	UI10	167
B10	015	U16	1082	A16	0140	GH10	171
BB10	015	E16	1082	E16	0140	I24	171
U15	0015	Ø16	1082	I16	0140	K20	172
R10	016	A21	0091	Ø16	0140	W20	172
RR10	016	Ø21	0091	U16	0140	B20	173
H10	016	I21	0091	NG10	1111	H20	173
Ø15	0016	E21	0091	NG10	2111	L20	174
SH10	021	E21	1092	CH10	112	T20	174
TH13	021	I21	1092	TCH10	112	U20	175
TH11	022	A21	1092	WH10	113	PH10	181
FE10	0031	Ø21	1092	QU10	114	C131	181
E25	031	A25	0093	GG10	115	TH12	182
Y19	0032	Ø22	0093	CC12	115	F7980	200
F10	041	A25	1093	G31	116	A12	211
FF10	041	Ø22	1093	AY10	121	I12	211
W10	041	I17	1101	EA11	122	Ø12	211
K10	042	U17	1101	EA31	122	U12	211
N20	042	E17	1101	ØØ11	123	E14	211
C12	042	A17	1101	ØØ12	123	I14	211
CK10	042	Ø17	1101	ØW11	124	A14	212
G12	043	Y17	102	ØW12	124	Ø14	212
J10	044	LE22	102	Ø31	131	U14	212
X10	044	A11	2104	U31	131	Y11	213
Y10	044	E11	2104	A23	132	Y15	213
V10	045	I11	2104	Ø23	132	A29	221
Z10	045	Ø11	2104	I22	133	A24	221
ZZ10	045	U11	2104	Ø24	133	I25	222
NG10	0050	A15	2104	E13	151	I26	231

Attachment 2
Wordlist
(Sample Output)

* RULE-BASED -WORDS *

*****BLOCK 1*****

N10 FREQUENCY= 0

NN10 FREQUENCY= 0

T10 FREQUENCY= 0

TT10 FREQUENCY= 0

A15 FREQUENCY= 1

ANT

I15 FREQUENCY= 0

BLOCK 1 UNIT 1 FREQUENCY= 1

P10 FREQUENCY= 0

PP10 FREQUENCY= 0

BLOCK 1 UNIT 1 FREQUENCY= 0

L10 FREQUENCY= 0

LL10 FREQUENCY= 0

S10 FREQUENCY= 0

SS10 FREQUENCY= 0

BLOCK 1 UNIT 3 FREQUENCY= 0

D10 FREQUENCY= 0
DD10 FREQUENCY= 0
E15 FREQUENCY= 0
 BLOCK 1 UNIT 4 FREQUENCY = 0

M10 FREQUENCY= 0
MM10 FREQUENCY= 0
B10 FREQUENCY= 0
BB10 FREQUENCY= 0
U15 FREQUENCY= 0
 BLOCK 1 UNIT 5 FREQUENCY = 0

R10 FREQUENCY= 0
RR10 FREQUENCY= 0
H10 FREQUENCY= 0
Ø15 FREQUENCY= 0
 BLOCK 1 UNIT 6 FREQUENCY= 0

TOTAL BLOCK 1 FREQUENCY= 1

#####TOTAL WORDS= 14#####

* FORTY-WORDS *

*****BLOCK 1*****

N10 FREQUENCY= 0

NN10 FREQUENCY= 0

N40 FREQUENCY= 0

T10 FREQUENCY= 0

TT10 FREQUENCY= 0

T40 FREQUENCY= 0

A15 FREQUENCY= 0

A40 FREQUENCY= 0

I15 FREQUENCY= 0

I40 FREQUENCY= 0

BLOCK 1 UNIT 1 FREQUENCY= 0

P10 FREQUENCY= 0

PP10 FREQUENCY= 0

P40 FREQUENCY= 0

BLOCK 1 UNIT 2 FREQUENCY= 0

I10 FREQUENCY= 0
LL10 FREQUENCY= 0
L40 FREQUENCY= 0
S10 FREQUENCY= 0
SS10 FREQUENCY= 0
S40 FREQUENCY= 0
SS40 FREQUENCY= 0
BLOCK 1 UNIT 3 FREQUENCY= 0

D10 FREQUENCY= 0
DD10 FREQUENCY= 0
D40 FREQUENCY= 0
E15 FREQUENCY= 0
E40 FREQUENCY= 0
BLOCK 1 UNIT 4 FREQUENCY= 0

M10 FREQUENCY= 0
MM10 FREQUENCY= 0
B10 FREQUENCY= 0
BB10 FREQUENCY= 0
B40 FREQUENCY= 0
U15 FREQUENCY= 0
U40 FREQUENCY= 0
BLOCK 1 UNIT 5 FREQUENCY= 0

R10 FREQUENCY= 0

RR10 FREQUENCY= 0

R40 FREQUENCY= 0

H10 FREQUENCY= 0

H40 FREQUENCY= 0

Ø15 FREQUENCY= 0

Ø40 FREQUENCY= 0

BLOCK 1 UN11 6 FREQUENCY= 0

TOTAL BLOCK 1 FREQUENCY= 0

*****BLOCK 2*****

#####TOTAL WORDS= 4#####

* WORDS WITH NO RULES *

CONSTITUTION

SHOVEL

#####TOTAL WORDS= 2#####



SOUTHWEST REGIONAL LABORATORY TECHNICAL NOTE

DATE August 27, 1970

NO TN 5-70-21

TITLE: CORRECT

AUTHOR: Richard Angilly and Lanaii Kline

ABSTRACT

CORRECT is a file maintenance program designed specifically to update input files for the program WORDLIST.

CORRECT

1.0 - PROGRAM IDENTIFICATION

CORRECT

2.0 - OBJECTIVE

The program was written to make corrections to individual records of the input file, ICARD, for the program WORDLIST.

3.0 - PROGRAM DESCRIPTION

3.1 - Program Logic

The program reads one hundred records at a time from input file, ICARD. From the terminal the user enters a number which points to the particular record to be changed (numbers range from 1 to 100). The system writes the record out on the console and waits for acknowledgment stating that the record is the one to be changed. If it is not, then the user enters another record number, and the process continues. Once the record is found, it is replaced by a record entered via the console. To change other records the process is repeated by stating a new record number for the input and by inputting successive groups of one hundred. A "z" is added in column 80 to assure that all records are 80 characters (card images) in length.

3.2 - Variables

IWORD(80,100) - input card images from the file, ICARD.
NAME - a card number from 1 to 100 representing the card to be updated. This variable is entered via the console.

4.0 - SUBROUTINES AND FUNCTIONS

None

5.0 - DATA SPECIFICATIONS

5.1 - Input Formats

File.	ICARD	Variable	Format
	Col 1-80	IWORD	80A1

File: console input
Free form formatting.

5.2 - Output Formats

File: NEW
Col 1-80

Variable Format
IWORD 80A1

6.0 - PROGRAM CONSTRAINTS AND LIMITATIONS

6.1 - Language

FORTRAN (Special commands used in the program limits the program to the ITS system)

6.2 - Vendor

International Time Sharing Corporation

6.3 - Storage Requirements

Random Access Disk

6.4 - Hardware Configuration

CDC*3300

6.5 - Program Parameters

The maximum number of records that can be processed at a time is one hundred. For files that have more than one hundred records, the program will read successive groups of one hundred until it finds an end-of-file. The output file name, NEW, must be changed after the program is executed so that it may become input for the WORDLIST program. The new name must be ICARD.

6.6 - Error Messages

None

7.0 - OPERATING INSTRUCTIONS

7.1 - The program is executed via interactive operation through operator intervention at a console.

7.2 - Operator Actions and Program Control Information

s = system response

u = user response

s: "WHICH LINE?"

u: user enters a number from 1 to 100 indicating that record to be changed. This number is read as variable, NAME.

s: The system writes the record indicated to the console.

s: "OK?"

u: Y this is the record to be modified.

N this is not the record to be modified.

If Y, then

s: "NOW GO"

u: enter the corrected record.
*s: "ANOTHER"
u: Y if there are more lines to be modified.
N if there are no more lines in the group of one hundred records to be modified.

If Y, then
s: "WHICH LINE?"
u: user enters a line number, and the process continues.

If N, then
s: "ANY MORE LINES?"
u: Y or N

If Y, then
s: "WHICH LINE?", and the process continues.

If N, then
s: The system processes the one hundred records and writes them on file, NEW. The program then reads another group of one hundred, and the process continues.

If N, then
s: "ANOTHER"
u: Y or N and the user continues as above (*).

7.3 - Sample data see Attachment 1.

7.4 - Sample run
See section 7.2 for example of sample run. The program updates the data base, ICARD, and writes the updated version on a tape.

8.0 - PROGRAM FLOWCHART

Not available.

```
PROGRAM CORRECT
DIMENSION IWORD(80,100)
OPEN(2),INPUT,ICARD
OPEN(3),OUTPUT,NEW
IT=0000
IEND=0
15  TYPE,"WHICH LINE?"
    ACCEPT,NAME
5   DO 100 I=1,100
    READ(2,10),(IWORD(N,I),N=1,80)
10  FORMAT(80A1)
    IF END RECORD 2,250
:00  CONTINUE
    IT=IT+100
60  IF(IT-NAME)50,150,150
50  IF(IEND-1)70,55,70
55  DO 130 J=1,(I-1)
    IF(IWORD(80,J)~"E")56,57,56
56  IWORD(80,J)="Z"
57  WRITE(3,10),(IWORD(N,J),N=1,80)
130  CONTINUE
    GO TO 300
70  WRITE(1,25),IT
25  FORMAT(10X,I4)
    DO 125 I=1,100
    IF(IWORD(80,I)~"E")120,110,120
120  IWORD(80,I)="Z"
110  WRITE(3,10),(IWORD(N,I),N=1,80)
125  CONTINUE
    GO TO 5
150  IF(IEND-1)160,170,170
170  J=NAME-(IT-1)
    GO TO 180
160  J=NAME-(IT-100)
180  WRITE(1,10),(IWORD(N,J),N=1,80)
    TYPE,"OK?"
    ACCEPT 99,NOW
99  FORMAT(A1)
    IF(NOW~"Y")75,200,75
200  TYPE,"    NOW GO"
    READ(2,10),(IWORD(N,J),N=1,80)
75  TYPE,"ANOTHER"
    ACCEPT 199,L0W
199  FORMAT(A1)
    IF(L0W~"Y")220,230,220
230  TYPE,"WHICH LINE?"
    ACCEPT,NAME
    GO TO 60
220  TYPE,"ANY MORE LINES ?"
    ACCEPT 299,M0W
299  FORMAT(A1)
    IF(M0W~"Y")225,230,225
225  NAME=6000
    GO TO 60
250  IT=IT+1
    WRITE(1,240),IT
240  FORMAT(10X,"END="I4,/)
    IEND=1
    GO TO 60
300  END
```

Attachment 1

ICARD
database

6 ABSENCE N	A16,B10,S10,E17,N10,C11,E18	1	
6 ABUSE N	A17,B10,U11,S40,E18	2	
6 ABUSE V	A17,B10,U11,S20,E18	2	
6 ACHE N,V	A40,CH31,E18	0	
6 ACTION N E	A16,C12	1	
6 CONSTITUTION N			
6 ANGLE N	A16,N20,G12,LE22	3	2
6 ANT N	A15	0	
6 BOW N,V	B40,OW40	0	
6 CUTE AJ P	C12,U11,T10,E18	3	
6 EARRING N	EA11,RR10,I15,NG10	1	3
6 EDGE N,V	E13,D10,G19,E18	0	
6 GET V E	G31,E15,T40	0	
6 GUARD N,V	G12,U20,A21,R10,D10	4	
6 HOUSE N	H10,OU10,S21,E18	0	
6 INVITE V	I16,N10,V10,I11,T10,E18	2	
6 RING N,V	R10,I15,NG10	0	
6 ROB V	R.O,Ø15,B10	1	
6 SEPARATE AJ P	S10,E40,P10,A32,R10,A17,T10,E18	0	
6 SHE PN	SH10,E25	3	
6 SHOVEL N,V			
6 STRANGE AJ	S10,T10,R10,A40,N10,G11,E18	0	
6 UNDER AV,PP	U16,N10,D10,E21,R10	1	
6XYØLK N	Y10,Ø23,I 20,K10,	0	

6 ABSENCE	A16,B10,S10,E17,N10,C11,E18	1	N
6 ABUSE	A17,B10,U11,S40,E18	2	N
6 ABUSE	A17,B10,U11,S20,E18	2	V
6 ACHE V	A40,CH31,E16	0	N
6 ACTION E	A16,C12	1	N
6 ADDITION			N
6 ANGLE	A16,N20,G12,LE22	3	23N
6 ANT	A15,N10,T10	0	N
6 BOW	B40,OW40	0	N,
6 CUTE P	C12,U11,T10,E18	3	AJ
6 EARRING	EA11,RR10,I15,NG10	1	34N
6 EDGE	E13,D10,G19,E18 V	0	N,
6 GET E	G31,E15,T40	0	V
6 GUARD	G12,U20,A21,R10,D10 V	4	N,
6 HOUSE	H10,OU10,S21,E18	0	N
6 INVITE	I16,N10,V10,I11,T10,E18	2	V
6 RING	R10,I15,NG10 V	0	N,
6 ROB	R 0,Ø15,E10	1	V
6 SEPARATE P	S10,E40,P10,A32,R10,A17,T10,E18, J	0	A
6 SHE	SH10,E25	3	PN
6 SHOVEL V			N
6 STRANGE	S10,T10,R10,A40,N10,G11,E18 J	0	A
6 UNDER PP	U10,N10,D10,E21,R10	1	AV
6XYØLK	Y10,Ø23,L20,K10,	0	N



SOUTHWEST REGIONAL LABORATORY TECHNICAL NOTE

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NO. TN-2-70-34

REGULAR AND IRREGULAR PRONUNCIATIONS OF GRAPHEMES

Betty Berdiansky and George Stanton

ABSTRACT

A complete listing is given of the various pronunciations of each grapheme in the SWRL reading program. These graphemes are also ordered according to pronunciation variability. The data specifically itemizes the low variability of English graphemes, and indicates the extent to which each grapheme's rules can be compressed for an overview of pronunciations. Based on this information, suggestions are also proposed for revisions in rule numbering, with particular attention given to irregular rules.

¹Section III, regarding rule revisions, of this Technical Note has been deleted for purposes of this Appendix.

REGULAR AND IRREGULAR PRONUNCIATIONS OF GRAPHEMES

The SWRL Reading Program incorporates two types of spelling-to-sound rules of correspondence. The first type, "regular" rules, has predictable pronunciations usually occurring in specifiable environments. The second type, "irregular" rules (numbered as Rule "40"¹), identifies correspondences considered too unproductive to be classified as regular rules, or exceptions to regular rules. An irregular correspondence of this latter type is one with a pronunciation not already covered by a regular rule, or one with a regular pronunciation occurring in an environment different from that specified by the regular rule.

This paper is divided into three sections with the following purposes: 1) Section I specifies the number and nature of the pronunciations covered by the regular rules and the "40" (i.e., irregular) rules for each grapheme; 2) Section II lists the graphemes having just one or two pronunciations, separately from those which are less predictable; and 3) Section III suggests improved classifications of the "40" rules and possible changes of some "40" rules to regular rules.

Most Consonant and Secondary Vowel graphemes have only one or two regular pronunciations. And for all Consonants but NG, S, and TH, and for all Secondary Vowels but IE, there is only one regular rule per pronunciation. Primary Vowels, however, each have an average of 6 regular pronunciations covered by 13 rules. Consonants and Secondary Vowels have an average of one or two irregular pronunciations. These "40" rule correspondences involve pronunciations other than those covered by regular rules, except in a minority of cases where one and occasionally two of the "40" pronunciations are the same as regular rules but occur in different environments. Primary vowels, on the other hand, have an average of 7 irregular pronunciations, one-half of which are the same as those accounted for by regular rules; they are irregular in that they occur in different environments.

Confronted with the large number of correspondence rules (166, although many of the vowel rules could be combined and then generalized across the Primary Vowels), and faced with the environmental details specified by the rules, the learner might lose sight of the degree to which the most important information to be gained about each grapheme--its pronunciation(s)--can be condensed from rules information. Another aspect of this grapheme pronunciation overview that the learner might not deduce is that the pronunciation variability is much lower for both Consonants and Secondary Vowels than for Primary Vowels, and that

¹ An explanation of the numbering system devised for the rules of correspondence is given in TR15, Berdiansky, Cronnell, & Koehler, 1969, Spelling-sound relations and primary form-class descriptions for speech-comprehension vocabularies of 6-9 year-olds, p. 13.

he will, therefore, have to concentrate more on environment specifications of the Primary Vowel rules for indications of correct pronunciations than he will for other rules.

Section I

Regular and "40" Rule Pronunciations

In Section I, Consonants, Primary Vowels, and Secondary Vowels are listed alphabetically. In brackets, on the same line as each grapheme, are listed all of that grapheme's possible pronunciations. A pronunciation is listed only once per grapheme even if it is covered by more than one of the grapheme rules.

Also listed is the pronunciation(s) for each regular rule, and one example (in capital letters) with the appropriate grapheme underlined. The Block and Unit position of the regular rules in the Sequence of Correspondences is given (e.g., Rule B10 first receives instruction in Block 1, Unit 5).

All base forms of "40" words (irregular words) are listed after the appropriate pronunciations. In order to have a comprehensive list of pronunciations for each grapheme, irregular nonlexicon pronunciations and exemplars are included (and asterisked). Some of these exemplars will also be considered for inclusion in future expanded lexicon studies of correspondence rules.

CONSONANTS

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
B		[b], [Ø]		
	10	[b]	BOY	1,5
	20	[Ø]	COM <u>B</u>	19,4
	40	[Ø]	de <u>b</u> t, dou <u>b</u> t	
BB		[b]		
	10	[b]	BUB <u>B</u> LE	1,5
C		[s], [k], [ç], [š]		
	11	[s]	C <u>I</u> TY	7,1
	12	[k]	C <u>A</u> T	4,2
	40	[š]	licor <u>i</u> ce, oce <u>a</u> n, spec <u>i</u> es	
		[s]	mus <u>c</u> le	
	E	[š]	spec <u>i</u> al, soc <u>i</u> al grac <u>i</u> ous, prec <u>i</u> ous, spac <u>i</u> ous, vic <u>i</u> ous glac <u>i</u> er	
		[ç]	anc <u>i</u> ent consc <u>i</u> ence, consc <u>i</u> ous	
CC	11	[k], [ks]	ACC <u>E</u> NT	20,4
	12	[k]	HIC <u>C</u> UP	11,5
	C12,C11	[ks]	ACC <u>E</u> NT, ACC <u>E</u> PT, SUC <u>C</u> EED, SUC <u>C</u> ESS	19,4
CH		[ç], [k], [š], [Ø]		

GRAPHIC UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
CH (con't)	10	[č]	<u>C</u> HEAP	11,2
	31	[k]	S <u>C</u> HOO <u>L</u>	20,2
	40	[š]	<u>ch</u> alet, <u>ch</u> amois, <u>ch</u> ampagne, <u>ch</u> auffeur, <u>ch</u> ef, <u>ch</u> ute, <u>ch</u> rochet, <u>ma</u> chine, <u>mo</u> ustache, <u>mu</u> stache, <u>sach</u> et	
		[ø]	y <u>ach</u> t	
CK		[k]		
	10	[k]	K <u>I</u> CK	4,2
D		[d], [t], [ø], [j]		
	10	[d]	<u>D</u> ID	1,4
	40	[t]	ch <u>app</u> ed, m <u>ash</u> ed, touch <u>ed</u> ; un <u>wash</u> ed	
		[ø]	ad <u>join</u> , ad <u>join</u> er, ad <u>just</u> , grand <u>ma</u> , grand <u>pa</u> , hand <u>som</u> e	
		[j]	sch <u>ed</u> ule	
	1	[j]	cord <u>i</u> al, sold <u>i</u> er	
DD		[d]		
	10	[d]	S <u>U</u> DD <u>E</u> N	1,4
F		[f], [v]		
	10	[f]	<u>F</u> UN	4,1
	40	[v]	o <u>f</u>	

GRAPHIC UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
FF		[f]		
	10	[f]	<u>OFF</u>	4,1
G		[j], [g], [ø], [ʒ]		
	11	[j]	<u>AGE</u>	7,1
	12	[g]	<u>GO</u>	4,3
	31	[g]	<u>GET</u>	11,6
	40	[ø]	assign, campaign, champagne, cologne, design, ensign, foreign, gnat, gnaw, reign, resign, sign, sovereign	
		[j]	judgment	
		[ʒ]	rouge	
GG		[g], [gʃ]		
	10	[g]	<u>EGG</u>	11,5
	G12, G11	[gʃ]	suggest	11,5
GH		[ø], [f], [g]		
	10	[ø]	<u>HIGH</u>	19,2
	40	[f]	cough, draught, enough, laugh, laughter, rough, tough, trough	
		[g]	ghost	

GRAPHIC UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
h		[h], {Ø}		
	10	[h]	<u>H</u> OME	1,6
	20	{Ø}	H <u>U</u> H	19,2
	40	{Ø}	dah <u>l</u> ia, ex <u>h</u> haust, ging <u>h</u> am, gra <u>h</u> am, he <u>ir</u> , heiress, <u>h</u> erb, homage, <u>h</u> onor, <u>h</u> our, kh <u>h</u> aki, raj <u>h</u> , rh <u>h</u> inestone, rh <u>h</u> ubarb, rh <u>h</u> yme, rh <u>h</u> ythm, sheph <u>h</u> erd	
j		[j], [h] or {Ø}, [y]*		
	10	[j]	<u>J</u> OY	4,4
	40	[h] or {Ø}	fri <u>j</u> oles, mari <u>j</u> uana*	
		[y]*	hallelu <u>j</u> ah*	
k		[k], {Ø}		
	10	[k]	MIL <u>k</u>	1,1
	20	{Ø}	<u>K</u> NOT	19,3
l		[l], {Ø}, [r]		
	10	[l]	<u>L</u> IKL	1,3
	20	{Ø}	WAL <u>L</u>	19,5

GRAPHIC UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
L (con't)	40	[Ø]	could, Lincoln, should, sold <u>er</u> would	
		[r]	col <u>onel</u>	
LI		[l], [y]		
	10	[l]	F <u>ILL</u>	1,3
	40	[y]	tortill <u>a</u>	
IL		[əl]		
	22	[əl]	LIT <u>TLE</u>	10,2
M		[m], [Ø]*		
	10	[m]	<u>MAN</u>	1,5
	40	[Ø]*	<u>m</u> neumonic*, com <u>p</u> troller*	
MM		[m]		
	10	[m]	SUM <u>ME</u> R	1,5
N		[n], [ŋ], [Ø], [n]		
	10	[n]	<u>NO</u>	1,1
	20	[ŋ]	SIN <u>K</u>	4,1
	40	[n]	con <u>crete</u> , en <u>g</u> age, in <u>cl</u> ine, in <u>cl</u> ose, in <u>cl</u> ude, in <u>co</u> me, in <u>cr</u> ease, in <u>qu</u> ire	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
N (con't)		[Ø]	autumn <u>n</u> , column <u>n</u> , condemn <u>n</u> , lam <u>n</u> , hym <u>n</u> , solemn <u>n</u> , mon <u>n</u> ieur	
		[ñ]	señor	
NN	10	[n]		
		[n]	INNER	1,1
NG		[ŋ], [ŋg], [nʃ]		
	10	[ŋ]	SING	5,5
	N20, G12	[ŋg]	ANGRY, Eng <u>l</u> and, Eng <u>l</u> ish, lang <u>u</u> age, pen <u>g</u> uin	10,2
	N20, G31	[ŋg]	ANG <u>E</u> R	11,6
	N10, G11	[nʃ]	DING <u>Y</u> , dun <u>g</u> eon, ven <u>g</u> ence	10,2
	40	[ŋ]	length, streng <u>th</u> , tong <u>u</u> e	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
P		[p], [Ø]		
	10	[p]	<u>POP</u>	1,2
	40	[Ø]	clap <u>board</u> , cor <u>ps</u> , cup <u>board</u> , <u>ps</u> alm, recei <u>pt</u> , sap <u>ph</u> ire	
PP		[p]		
	10	[p]	<u>APPLE</u>	1,2
PH		[f], [p]		
	10	[f]	<u>PHONE</u>	20,2
	P10,H40	[p]	shep <u>h</u> erd	
QU		[kw], [k]		
	10	[kw]	<u>QUICK</u>	11,4
	40	[k]	ant <u>iq</u> ue, bou <u>q</u> uet, con <u>q</u> uer, cro <u>q</u> uet, lac <u>q</u> uer, li <u>q</u> uor, mes <u>q</u> uite, mos <u>q</u> ue, pla <u>q</u> ue, <u>q</u> ueue, uni <u>q</u> ue	
R		[r], [ə]		
	10	[r]	<u>RUN</u>	1,6
	40	[ə]	ac <u>r</u> e, og <u>r</u> e	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
RR		[r]		
	10	[r]	HUR <u>RY</u>	1,6
S		[s], [z], [Ø], [š], [ž], [č]		
	10	[s]	S <u>UN</u>	1,3
	20	[z]	NO <u>S</u> E	18,2
	21	[s]	HO <u>U</u> SE	18,2
	31	[z]	WIV <u>E</u> S	7,2
	40	[s]	ab <u>u</u> se, a <u>s</u> ide, ba <u>s</u> in, ba <u>s</u> is, bi <u>s</u> on, clo <u>s</u> e, cr <u>u</u> sade, decr <u>e</u> ase, do <u>s</u> e, exc <u>u</u> se, ge <u>e</u> se, lea <u>s</u> e, ma <u>s</u> on, me <u>s</u> a, nuis <u>a</u> nce, porpo <u>i</u> se, prom <u>i</u> se, purpo <u>s</u> e, rese <u>a</u> rch, resou <u>r</u> ce, sau <u>s</u> age, tortoi <u>s</u> e, u <u>s</u> age, u <u>s</u> e, val <u>i</u> se, vi <u>s</u> e	
		[z]	ab <u>s</u> orb, a <u>s</u> , clea <u>n</u> se, clum <u>s</u> y, cos <u>m</u> os, dis <u>m</u> al, ha <u>s</u> , hi <u>s</u> , hu <u>s</u> band, i <u>s</u> , jerse <u>y</u> , mea <u>s</u> les, mu <u>s</u> lin, ob <u>s</u> erve, pa <u>n</u> sy, pla <u>s</u> ma, Thurs <u>d</u> ay, Tues <u>d</u> ay, wa <u>s</u> , Wednes <u>d</u> ay, wis <u>d</u> om	
		[Ø]	ai <u>s</u> le, cha <u>m</u> ois, cor <u>p</u> s, i <u>s</u> land, i <u>s</u> le	
		[š]	cat <u>š</u> up, i <u>n</u> su <u>r</u> e, su <u>g</u> ar, su <u>r</u> e	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
S (con't)	E	[č̣]	con <u>science</u> , con <u>scious</u>	
		[ž]	As <u>ia</u> vi <u>sion</u> mea <u>s</u> ure, plea <u>s</u> ure, treas <u>ure</u>	
		[š]	man <u>sion</u> , pen <u>sion</u> , ten <u>sion</u>	
SS		[s], [ṣ̌], [z]		
	10	[s]	ME <u>ss</u>	1,3
	40	[ṣ̌]	iss <u>ue</u> , tiss <u>ue</u>	
		[z]	dess <u>ert</u> , diss <u>olve</u> , poss <u>ess</u> , sciss <u>ors</u>	
	E	[ṣ̌]	Russ <u>ian</u> miss <u>ion</u> , sess <u>ion</u> ass <u>ure</u> , press <u>ure</u>	
SH		[ṣ̌]		
	10	[ṣ̌]	R <u>ush</u>	2,1
T		[t], [θ], [č̣], [θ̣]		
	10	[t]	<u>T</u> EN	1,1
	20	[θ]	OF <u>T</u> EN	19,5
	40	[θ]	ballet <u>t</u> , bouquet <u>t</u> , buffet <u>t</u> , chalet <u>t</u> , chestnut, Christ <u>m</u> as, crochet <u>t</u> , croquet <u>t</u> , depot <u>t</u> , mortgag <u>e</u> , sachet <u>t</u> , valet <u>t</u>	
			natur <u>a</u> l, stat <u>ue</u>	

GRAPEHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
T (con't)	E	[č]	right <u>e</u> ous Christ <u>i</u> an quest <u>i</u> on fort <u>u</u> ne capt <u>u</u> re, creat <u>u</u> re, cult <u>u</u> re, feat <u>u</u> re, fix <u>u</u> re, fract <u>u</u> re, fut <u>u</u> re, lect <u>u</u> re, mix <u>u</u> re, moist <u>u</u> re, nat <u>u</u> re, past <u>u</u> re, pict <u>u</u> re, post <u>u</u> re, punct <u>u</u> re, rapt <u>u</u> re, sculpt <u>u</u> re, stat <u>u</u> re, struct <u>u</u> re, tort <u>u</u> re, vent <u>u</u> re, vult <u>u</u> re	
		[č] or [t]	mat <u>u</u> re	
		[š]	part <u>i</u> al pat <u>i</u> ence pat <u>i</u> ent, quot <u>i</u> ent rat <u>i</u> o caut <u>i</u> ous act <u>i</u> on, auct <u>i</u> on, caut <u>i</u> on, dict <u>i</u> on, fact <u>i</u> on, fict <u>i</u> on, fract <u>i</u> on, frict <u>i</u> on, junct <u>i</u> on, ment <u>i</u> on, mot <u>i</u> on, nat <u>i</u> on, not <u>i</u> on, port <u>i</u> on, pot <u>i</u> on, sect <u>i</u> on, stat <u>i</u> on, tract <u>i</u> on	
TT	10	[t]		
		[t]	LIT <u>T</u> LE	1,1
TCH	10	[č]		
		[č]	MAT <u>CH</u>	11,2
TH		[θ], [ð], [θ], [t]		
	11	[θ]	TH <u>I</u> N	2,2
	12	[ð]	FAT <u>H</u> ER	20,3

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
TH (con't)	13	[ð]	<u>TH</u> IS	2,1
	40	[ð]	clo <u>th</u> ing, fa <u>th</u> om, hea <u>th</u> en, rhy <u>th</u> m, smoo <u>th</u> , swa <u>th</u> ry, wo <u>th</u> ry	
		[θ]	e <u>th</u> er, pa <u>th</u> er	
		[θ]	ast <u>h</u> ma*, clo <u>th</u> es, ist <u>h</u> mus	
		[t]*	<u>th</u> yme*	
V		[v]		
	10	[v]	<u>VER</u> SE	4,5
W		[w], [Ø]		
	10	[w]	<u>W</u> ET	4,1
	20	[Ø]	<u>WR</u> ONG	19,3
	40	[Ø]	ans <u>w</u> er, s <u>w</u> ord, t <u>w</u> o	
WH		[w] or [hw], [h]		
	10	[w] or [hw]	<u>WH</u> EN	11,3
	40	[h]	<u>wh</u> o, <u>wh</u> ole, <u>wh</u> olly, <u>wh</u> om, <u>wh</u> ose	
X		[ks], [gz], [z], [kʰ]		

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
X (con't)	10	[ks]	BOX	4,4
	40	[gz]	exact, exalt, exam, exert, exhaust, exist xylophone*, xerox*	
		[z]		
	E	[kʃ]	anxious	
Y		[y]		
	10	[y]	YES	4,4
Z		[z], [s], [θ], [ʒ]		
	10	[z]	ZOO	4,5
	40	[s]	waltz	
		[θ]*	rendezvous*	
	E	[ʒ]	glazier	
ZZ		[z], [ts]		
	10	[z]	BUZZ	4,5
	40	[ts]	pizza	

PRIMARY VOWELS

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
A		[e], [æ], [ə] or [ɪ], [a], [ɔ] [ɛ] or [æ], [a] or [ɔ], [o], [ʊ]		
	11	[e]	NAME	6,1
	12	[e]	ACRE	25,4
	13	[e]	BABY	18,1
	14	[e]	APRIL	25,5
	15	[æ]	SAT	1,1
	16	[æ]	JACKET	8,2
	17	[ə] or [ɪ]	METAL	10,1
	21	[a]	CAR	9,1
	22	[ɛ] or [æ]	MARRY	18,3
	23	[ɔ]	BALL	13,2
	24	[a] or [ɔ]	WAD	23,1
	25	[o]	WAR	9,3
	29	[e]	PASTE	23,1
	32	[ʊ]	SEPARATE	27,6
	38	[ə]	CAVERN	24,2
	40	[e]	a, <u>a</u> che, <u>a</u> ncient, ba <u>ss</u> , ba <u>th</u> e, cha <u>m</u> ber, cha <u>mpa</u> gne ha <u>s</u> ten, ha <u>s</u> ty, pa <u>s</u> ter, pa <u>s</u> try, su <u>n</u> dæ, ta <u>s</u> ty	
		[æ]	a <u>c</u> id, a <u>d</u> enoid, a <u>g</u> ate, a <u>t</u> om, ba <u>b</u> oon, ba <u>l</u> ance, ba <u>n</u> ish, ca <u>b</u> in, ca <u>f</u> e, ca <u>m</u> el, ca <u>m</u> era, cha <u>l</u> et, cha <u>m</u> ois, cha <u>p</u> el, co <u>m</u> ra <u>d</u> e, da <u>m</u> age,	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
A	40 (con't)		dragon, fam <u>i</u> ne, frag <u>i</u> le, gran <u>i</u> te, hab <u>i</u> t, khak <u>i</u> , Lat <u>i</u> n, mad <u>a</u> m, mag <u>i</u> c, mal <u>i</u> ce, man <u>a</u> ge, pag <u>e</u> ant, pal <u>a</u> ce, pan <u>e</u> l, pan <u>i</u> c, pap <u>o</u> ose, pat <u>e</u> nt, plan <u>e</u> t, pl <u>a</u> que, plat <u>e</u> au, plaz <u>a</u> , rad <u>i</u> sh, rap <u>i</u> d, sal <u>a</u> d, sat <u>i</u> n, sat <u>u</u> rn, shad <u>o</u> w, sh <u>a</u> ll, sh <u>a</u> llow, span <u>i</u> el, Span <u>i</u> sh, stat <u>u</u> e, stat <u>u</u> re, str <u>a</u> ta, sw <u>a</u> m, tab <u>o</u> o, tal <u>e</u> nt, tr <u>a</u> peze, vac <u>u</u> um, va <u>l</u> et, val <u>o</u> r, val <u>u</u> e, van <u>i</u> sh, wag <u>o</u> n	
		[a]	ah, ah <u>a</u> , al <u>m</u> ond, am <u>e</u> n are, ba <u>a</u> , ba <u>h</u> , baz <u>a</u> ar, cal <u>m</u> , dr <u>a</u> ma, fat <u>h</u> er, gar <u>a</u> ge, grand <u>m</u> a, grand <u>p</u> a, h <u>a</u> , hurrah, la, lav <u>a</u> , ll <u>a</u> ma, m <u>a</u> , p <u>a</u> , pal <u>m</u> , psalm, raj <u>a</u> h, y <u>a</u> cht, y <u>a</u> h	
		[ɔ]	al <u>m</u> ost, al <u>r</u> ight, al <u>s</u> o, al <u>t</u> hough, al <u>w</u> ays, fal <u>s</u> e, walnut, walrus	
		[ɛ]	an <u>y</u> , man <u>y</u>	
		[ə]	was, wh <u>a</u> t	
E		[i], [ɛ], [ə] or [I], [ə], [Ø], [e], [I] or [U]		
	11	[i]	HER <u>E</u>	6,2
	13	[i]	HER <u>O</u>	18,1
	14	[i]	ZEB <u>R</u> A	25,5
	15	[ɛ]	SE <u>T</u>	1,4
	16	[ɛ]	EX <u>T</u> R <u>A</u>	8,2
	17	[ə] or [I]	HID <u>D</u> EN	10,1

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITON IN SEQUENCE
E (con't)	18	[Ø]	NAME	6,1
	19	[Ø]	WIVES	7,2
	21	[ə]	HERD	9,1
	25	[i]	WE	3,1
	26	[i]	CREATE	25,2
	32	[Ø]	SEVERAL	27,6
	38	[ε]	EXIT	25,2
	40	[i]	ether, people, recharge	
		[ε]	allege, celery, chemist, cherish, credit, decade, deluge, desert, emerald, ere, federal, general, generous, herald, heron, legend, lemon, leopard, medal, melon, menace, menu, metal, nowhere, pedal, peril, perish, petal, precious, preface, presence, present, rebel, record, reference, refuge, relic, schedule, second, senate, señor, separate, sheriff, special, tenant, there, very, veteran, where	
		[e]	ballet, bouquet, buffet, cafe, chalet, crepe, crochet, croquet, fete, mesa, re, sachet, valet	
		[Ø]	chauffeur, dungeon, Europe, grandeur, luncheon, monsieur, pigeon, queue, surgeon, Wednesday, yeoman	
		[ə]	the, were	
		[I]	England, English	
		[I] or [U]	pretty	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
I		[ay], [I] or [ə], [I], [ə], [y], [Ø], [i]		
	11	[ay]	<u>F</u> INE	6,1
	12	[ay]	<u>I</u> DLE	25,4
	13	[ay]	C <u>I</u> DER	18,1
	14	[ay]	<u>I</u> DLY	25,5
	15	[I]	S <u>I</u> T	1,1
	16	[I]	L <u>I</u> TTL <small>E</small>	8,2
	17	[ə] or [I]	OFF <u>I</u> CE	10,1
	21	[ə]	B <u>I</u> RD	9,1
	22	[ay]	F <u>I</u> ND	13,3
	24	[ay]	H <u>I</u> GH	19,2
	25	[y]	ON <u>I</u> ON	23,2
	26	[ay]	L <u>I</u> AR	25,2
	32	[Ø]	AS <u>P</u> IRIN	27,6
	38	[I]	R <u>I</u> VER	24,2
	40	[ay]	Ch <u>r</u> ist, c <u>i</u> pher, cl <u>i</u> mb, h <u>i</u> , <u>I</u> , <u>i</u> sland, n <u>i</u> nth, p <u>i</u> nt, s <u>i</u> phon	
		[I]	c <u>i</u> ty, ch <u>i</u> li, cl <u>i</u> nic, f <u>i</u> gure, f <u>i</u> nish, fr <u>i</u> gid, gu <u>i</u> nea, g <u>i</u> tar, im <u>a</u> ge, lib <u>e</u> ral, lic <u>o</u> rice, l <u>i</u> ly, l <u>i</u> mit, l <u>i</u> nen, l <u>i</u> quid, l <u>i</u> quor, l <u>i</u> zard, m <u>i</u> m <u>i</u> c, m <u>i</u> nute, p <u>i</u> geon, p <u>i</u> ty, p <u>r</u> imer, p <u>r</u> ison, r <u>i</u> sen, s <u>i</u> n <u>e</u> w, sp <u>i</u> got, sp <u>i</u> nach, sp <u>i</u> rit, t <u>i</u> mid, t <u>r</u> ibute, v <u>i</u> cious, v <u>i</u> gor, v <u>i</u> neyard, v <u>i</u> sion, v <u>i</u> sit, w <u>i</u> dow, w <u>i</u> nd, w <u>i</u> zard	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
I	40 (con't)	[i]	ant <u>i</u> que, chili <u>i</u> , chlor <u>i</u> ne, fat <u>i</u> gue, fi <u>o</u> rd, Hop <u>i</u> , khaki <u>i</u> , mach <u>i</u> ne, mar <u>i</u> ne, mesqu <u>i</u> te, m <u>i</u> , mob <u>i</u> le, p <u>i</u> zza, pol <u>i</u> ce, rav <u>i</u> ne, sard <u>i</u> ne, ski <u>i</u> , su <u>i</u> te, tax <u>i</u> , t <u>i</u> , un <u>i</u> que, vacc <u>i</u> ne, val <u>i</u> se	
		[ø]	bus <u>i</u> ness, fash <u>i</u> on, leg <u>i</u> on, marri <u>a</u> ge, reg <u>i</u> on	
O		[o], [a], [ə] or [I], [ə], [I], [ø], [a] or [o] or [ɔ], [ɔ] or [a], [u], [U], [wə], [ə]		
	11	[o]	HO <u>M</u> E	6,2
	12	[o]	NO <u>B</u> LE	25,4
	13	[o]	NO <u>T</u> ICE	18,1
	14	[o]	ON <u>L</u> Y	25,5
	15	[a]	LO <u>T</u>	1,6
	16	[a]	HO <u>C</u> KEY	8,2
	17	[ə] or [I]	CO <u>T</u> TON	10,1
	21	[a] or [o] or [ɔ]	HO <u>R</u> N	9,1
	22	[ə]	WO <u>R</u> D	9,3
	23	[o]	GO <u>L</u> D	13,2
	24	[ɔ] or [a]	SO <u>N</u> G	13,3
	25	[o]	GO <u>O</u>	18,4

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
() (con't)	26	[o]	PO <u>EM</u>	25,2
	31	[ə]	W <u>ON</u>	13,1
	32	[Ø]	SOPH <u>OMORE</u>	27,6
	38	[a]	NO <u>VEL</u>	24,2
	40	[o]	almost, both, clothe, clothes, cologne, comb, control, cro <u>chet</u> , dep <u>ot</u> , gh <u>ost</u> , g <u>oph</u> er, gr <u>oss</u> , holster, h <u>ost</u> , h <u>ost</u> ess, m <u>ost</u> , <u>O</u> , oh, pat <u>rol</u> , p <u>ost</u> , p <u>ost</u> age, p <u>ost</u> al, p <u>ost</u> er, p <u>ost</u> pone, s <u>ol</u> , soldier, t <u>roph</u> y, ut <u>most</u> , wh <u>olly</u>	
		[a]	body, ch <u>ocol</u> ate, ch <u>ronic</u> , clo <u>set</u> , col <u>umn</u> , com <u>et</u> , c <u>op</u> y, fr <u>ol</u> ic, h <u>om</u> age, h <u>on</u> est, h <u>on</u> or, m <u>od</u> el, m <u>od</u> ern, m <u>od</u> est, mon <u>arch</u> , ol <u>ive</u> , ph <u>on</u> ic, pol <u>ish</u> , p <u>ro</u> cess, p <u>ro</u> duct, p <u>ro</u> fit, p <u>ro</u> ject, p <u>ro</u> mise, p <u>ro</u> p <u>er</u> , ro <u>bin</u> , ro <u>sin</u> , schol <u>ar</u> , sol <u>emn</u> , sol <u>id</u> , t <u>on</u> ic, t <u>op</u> ic, t <u>ro</u> p <u>ic</u> , vol <u>um</u> e, vom <u>it</u>	
		[u]	do, im <u>pr</u> ove, lo <u>se</u> , m <u>ov</u> e, m <u>ov</u> ie, p <u>ro</u> ve, r <u>em</u> ove, t <u>o</u> , t <u>omb</u> , t <u>wo</u> , wh <u>o</u> , wh <u>om</u> , wh <u>ose</u>	
		[Ø]	colon <u>el</u> , ir <u>on</u> , leop <u>ard</u> , p <u>eo</u> ple	
		[a] or [ɔ]	beg <u>one</u> , g <u>ol</u> f, g <u>one</u> , sw <u>ollen</u>	
		[U]	b <u>os</u> cm, w <u>ol</u> f, w <u>ol</u> ves, w <u>om</u> an	
		[wə]	o <u>nce</u> , o <u>ne</u>	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
O	40 (con't)	[I]	w <u>o</u> men	
		[ə]	col <u>o</u> nel	
		[ə] or [u] or [Ø]	t <u>o</u> ward	
U		[(y)u], [ə], [Ø], [ə] or [I], [U], [ε], [I], [w]		
	EAU	[o] or [yu]		
	11	[(y)u]	<u>U</u> SE	6,2
	12	[(y)u]	<u>B</u> UGLE	25,4
	13	[(y)u]	<u>U</u> NIT	18,1
	14	[(y)u]	<u>B</u> UGLER	25,5
	15	[ə]	<u>G</u> UM	1,6
	16	[ə]	<u>S</u> UDDEN	8,2
	17	[ə] or [I]	<u>L</u> ETT <u>U</u> CE	10,1
	20	[Ø]	<u>G</u> UARD	19,6
	21 (formerly U15 & U16 / __r)	[ə]	<u>B</u> URN	9,1
	26	[(y)u]	<u>R</u> UIN	25,6
	31	[U]	<u>P</u> USH	13,1
	32	[Ø]	<u>N</u> A <u>T</u> U <u>R</u> AL	27,6
	40	[w]	jag <u>u</u> ar, lang <u>u</u> age, peng <u>u</u> in, pers <u>u</u> ade, pueb <u>l</u> o, su <u>i</u> te	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
U	40 (con't)	[ə]	pun <u>ish</u> , stud <u>y</u> , sub <u>urb</u>	
		[u]	cuckoo, flu <u>,</u> tru <u>th</u>	
		[yu]	men <u>u</u> , vacu <u>um</u>	
		[I]	bus <u>iness</u> , bus <u>y</u>	
		[Ø]	bu <u>y</u> , dis <u>guise</u>	
		[ε]	bu <u>ry</u>	
		[U]	sug <u>ar</u>	
EAU	U40 + EA40	[o]	' <u>eau</u> , bu <u>reau</u> , plate <u>au</u>	
		[yu]	be <u>au</u> ty	
Y		[ay], [I], [i] or [I], [ə], [ə] or [I]		
	11	[ay]	R <u>HYME</u>	23,3
	15	[I]	M <u>YTH</u>	23,3
	17	[i] or [I]	B <u>ABY</u>	10,2
	19	[ay]	T <u>RY</u>	3,2
	40	[ay]	by <u>e</u> , dy <u>e</u> , hy <u>phen</u> , ly <u>e</u> , ry <u>e</u> , scy <u>the</u> , typhoid, typh <u>oon</u>	
		[I]	phys <u>ics</u> , Plym <u>outh</u>	
		[ə]	mar <u>tyr</u> , myrr <u>h</u>	
		[ə] or [I]	sy <u>rup</u>	

SECONDARY VOWELS

GRAPHIC UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
AI		[e], [ə] or [ɪ], [ɛ], [ay], [æ]		
	10	[e]	<u>RAIN</u>	16,1
	17	[ə] or [ɪ]	<u>CAPTAIN</u>	26,3
	40	[ɛ]	<u>again</u> , <u>said</u>	
		[ay]	<u>aisle</u> , <u>kaiak</u>	
		[æ]	<u>plaid</u>	
AY		[e], [ay]		
	11	[e]	<u>DAY</u>	12,1
	40	[ay]	<u>aye</u>	
AU		[ɔ], [æ] or [s], [æ], [o], [ø]		
	10	[ɔ]	<u>CAUSE</u>	16,4
	40	[æ] or [a]	<u>aunt</u>	
		[æ]	<u>draught</u> , <u>laugh</u> <u>laughter</u>	
		[o]	<u>chauffeur</u>	
		[ø]	<u>restaurant</u>	
AW		[ɔ]		
	10	[ɔ]	<u>SAW</u>	16,4
EA		[ɪ], [ɛ], [ə] or [ɪ], [ə], [e], [a]		
	EA	[o], [yu]		

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
EA (con't)	11	[ɪ]	<u>EACH</u>	12,2
	31	[ɛ]	<u>DEAF</u>	12,2
	33	[ə]	<u>EARN</u>	26,4
	40	[e]	<u>break</u> , <u>great</u> , <u>steak</u> , <u>yea</u>	
		[a]	<u>heart</u> , <u>hearth</u>	
		[ə] or [ɪ]	<u>ocean</u> , <u>pageant</u> , <u>sergeant</u> , <u>vengeance</u>	
EAU	EA40 + U40	[o]	<u>beau</u> , <u>bureau</u> , <u>plat<u>cau</u></u>	
		[yu]	<u>beauty</u>	
EE		[i], [ɪ], [e]*		
	10	[i]	<u>SEE</u>	3,1
	40	[ɪ]	<u>been</u> , <u>breeches</u> , <u>creek</u>	
		[e]*	<u>matinee</u> *, <u>melee</u> *	
EI		[i], [e], [ɪ], [ay], [ɛ]		
	10	[ɪ]	<u>CEILING</u>	26,5
	20	[e]	<u>NEIGHBOR</u>	26,6
	40	[ɪ]	<u>foreign</u> , <u>forfe<u>it</u></u>	
		[ay]	<u>height</u>	
		[ɛ]	<u>heifer</u> , <u>heir</u> , <u>heiress</u> , <u>the<u>ir</u></u>	
		[e]	<u>veil</u>	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
EW		[(y)u], [o]		
	10	[(y)u]	<u>NE</u> <u>W</u>	16,6
	40	[o]	<u>se</u> <u>w</u>	
EY		[e], [i], [ay]		
	10	[e]	O <u>B</u> <u>E</u> <u>Y</u>	26,6
	17	[i]	M <u>O</u> <u>N</u> <u>E</u> <u>Y</u>	26,2
	40	[ay]	<u>eye</u> , <u>geyser</u>	
		[i]	<u>key</u>	
IE		[ay], [i], [ε], [I], [I] or [ə]		
	11	[ay]	D <u>I</u> <u>E</u>	19,2
	12	[i]	F <u>I</u> <u>E</u> <u>L</u> <u>D</u>	26,5
	17	[i]	M <u>O</u> <u>V</u> <u>I</u> <u>E</u>	26,2
	40	[ε]	f <u>r</u> <u>i</u> <u>e</u> <u>n</u> <u>d</u>	
		[I]	s <u>i</u> <u>e</u> <u>v</u> <u>e</u>	
		[I] or [ə]	ker <u>ch</u> <u>i</u> <u>e</u> <u>f</u> , mis <u>ch</u> <u>i</u> <u>e</u> <u>f</u>	
OA		[o], [ɔ], [ə]		
	10	[o]	C <u>O</u> <u>A</u> <u>T</u>	16,3
	40	[ɔ]	ab <u>ro</u> <u>a</u> <u>d</u> , br <u>oa</u> <u>d</u> , br <u>oa</u> <u>d</u> cast	
		[ə]	clap <u>bo</u> <u>a</u> <u>r</u> <u>d</u> , cup <u>bo</u> <u>a</u> <u>r</u> <u>d</u>	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
OL		[o], [u], [ə]		
	10	[o]	TO <u>E</u>	16,3
	40	[u]	can <u>oe</u> , sho <u>e</u>	
		[ə]	do <u>es</u>	
		[o]	go <u>es</u>	
OI		[oy], [i], [way], [ə] or [I]		
	10	[oy]	NO <u>ISE</u>	16,5
	40	[i]	cham <u>ci</u> s	
		[way]	cho <u>ir</u>	
		[ə] or [I]	porpo <u>ise</u> , torto <u>ise</u>	
OO		[u], [U], [ə], [o]		
	11	[u]	TO <u>OL</u>	12,3
	12	[U]	BO <u>OK</u>	12,3
	40	[ə]	blo <u>od</u> , flo <u>od</u>	
		[o]	do <u>or</u> , flo <u>or</u>	
OU		[aw], [ə], [(y)u], [ɔ], [o], [U]		
	10	[aw]	CO <u>UNT</u>	16,2
	31	[ə]	Y <u>OUNG</u>	26,7
	33	[(y)u]	GR <u>OU</u> P	26,7
	34	[ɔ]	FO <u>U</u> GHT	26,7
	35	[o]	SO <u>U</u> L	26,7

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
OU (con't)	40	[U]	<u>could</u> , should , <u>would</u>	
OW		[o], [o] or [ə], [aw], [a]		
	11	[o]	GLOW	12,4
		[o] or [ə] in unstressed syllables	YELLOW	
	12	[aw]	NOW	12,4
	40	[a]	know <u>ledge</u>	
OY		[oy], [i]		
	10	[oy]	BOY	16,5
	40	[i]	buoy	
UE		[(y)u], [ø]		
	10	[(y)u]	BLUE	16,6
	40	[ø]	fatigue, league, plague, queue, rogue, tongue	
UI		[(y)u], [I]		
	10	[(y)u]	FRUIT	16,6
	31	[I]	BUILD	26,8
EW				

Section II

Graphemes Grouped According to Pronunciation Variability

The purpose of grouping graphemes by their degree of pronunciation variability was to determine which graphemes could, instructionally, have just one or two pronunciations associated with them with little or no emphasis on environmental information, and which would require information about the position of the grapheme in that exemplar to determine the pronunciation.

Five categories of pronunciation variability are listed. Beginning with graphemes having invariant pronunciations, the categories are presented in order of increasing grapheme pronunciation variability. Within each category, the order of graphemes is: single consonants, geminate consonants, digraphs, primary vowels, and secondary vowels. These subgroups are separated by a dotted line.

If a grapheme has irregular correspondences with pronunciations not covered by that grapheme's regular rules, these particular exemplars are listed. No regular words, and no "40" words having the same pronunciation as regular rules, are listed.

In order to have a comprehensive list of pronunciations for each grapheme, irregular nonlexicon pronunciations and exemplars are included (and asterisked).

The data indicates that geminate consonants are invariant or very nearly so, with the only exception being SS, which has one major pronunciation and two minor ones. Single consonants tend to have a major pronunciation with a few irregular exemplars, or to have a major pronunciation and a secondary pronunciation. The only consonants which could not be fit into this description (by acknowledging automatic selection by the reader of the correct allophones for D and N, for example) are C, G, S, and T. Consonant digraphs have one or sometimes two pronunciations, with the exceptions being CH and NG (and the latter's pronunciation depends on environment). Secondary Vowels have one or two pronunciations, except for EA and OU which each have more than three common pronunciations. Primary Vowels are highly variant, with an average of seven pronunciations.

INVARIANT PRONUNCIATIONS

M	[m]		CK	[k]
	[Ø]*	mneumonics*, comptroller*		
V	[v]		LE	[ə1]
-----			SH	[ʃ]
BB	[b]		TCH	[tʃ]
DD	[d]		-----	
FF	[f]		AW	[ɔ]
MM	[m]			
NN	[n]			
PP	[p]			
RR	[r]			
TT	[t]			

ONE MAJOR PRONUNCIATION WITH 1-6 EXCEPTIONS

F	[f] [v] of	AU	[ɔ] [æ] or [a] <u>aunt</u> [æ] <u>laugh</u> [o] <u>chauffeur</u> [Ø] <u>restaurant</u>
J	[j] [h] or [Ø] <u>frijoles</u> , <u>marijuana</u> * [y]* <u>hallelujah</u> *	AY	[e] [ay] <u>aye</u>
R	[r] [ə] <u>acre</u> , <u>ogre</u>	EE	[i] [I] <u>been</u> , <u>breeches</u> , <u>creek</u> [e]* <u>matinee</u> *, <u>melee</u> *
Z	[z] [s] <u>waltz</u> [ʒ] <u>glazier</u> [Ø]* <u>rendezvous</u> *	EW	[(y)u] [o] <u>sew</u>
-----		OA	[o] [ɔ] <u>broad</u> [ə] <u>clapboard</u> , <u>cupboard</u>
CC	[k] [ks] <u>accent</u> , <u>accept</u> , <u>succeed</u> , <u>success</u>	OE	[o] [u] <u>canoe</u> , <u>shoe</u> [ə] <u>does</u>
GG	[g] [gʃ] <u>suggest</u>	OI	[oy] [i] <u>chamois</u> [way] <u>choir</u> [ə] or [I] <u>propoise</u> , <u>tortoise</u>
LL	[l] [y] <u>tortilla</u>	OY	[oy] [i] <u>buoy</u>
ZZ	[z] [ts] <u>pizza</u>	UE	[(y)u] [Ø] <u>fatigue</u> , <u>league</u> , <u>plague</u> , <u>queue</u> , <u>rogue</u> , <u>tongue</u>

PH	[f] [p] <u>shepherd</u>		
WH	[w] or [hw] [h] <u>who</u> , <u>whole</u> , <u>wholly</u> , <u>whom</u> , <u>whose</u>		

TWO PRONUNCIATIONS

B	[b] [Ø]	QU	[kw] [k]	ant <u>ique</u> , bou <u>quet</u> , con <u>quer</u> , cro <u>quet</u> , lac <u>quer</u> , li <u>quor</u> mes <u>quite</u> , mos <u>que</u> , pla <u>que</u> , <u>que</u> ue, uni <u>que</u>
H	[h] [Ø]			
K	[k] [Ø]	UI	[(y)u] [I] or [ə]	
P	[p] [Ø]			clap <u>board</u> , corp <u>s</u> , cup <u>board</u> , psalm, recei <u>pt</u> , sapp <u>hire</u> , p <u>seudo</u> ,* p <u>sy</u> chology,* p <u>neumonia</u> ,* p <u>to</u> maine*
W	[w] [Ø]			
X	[ks] [gz] [z]*			ex <u>a</u> ct, ex <u>a</u> lt, ex <u>a</u> m, ex <u>e</u> rt, ex <u>a</u> st, ex <u>i</u> st, xylophone,* x <u>e</u> rox*

TWO PRONUNCIATIONS WITH 1-6 EXCEPTIONS

L [ɪ]
[ʊ]
[r] colonel

GH [ʊ]
[f] cough, draught,
enough, laugh,
laughter, rough,
tough, trough
[g] ghost

TH [θ]
[ð]
[ʊ] clothes, isthmus,
asthma*
[t]* thyme*

AI [e]
[ə] or [ɪ]
[ɛ] again, against,
said
[ay] aisle, kaiak
[æ] plaid

EI [ɪ]
[e]
[ɪ] foreign, forfeit
[ay] height
[ɛ] heifer, heir, their

EY [e]
[ɪ]
[ay] eye, geyser

IE [ay]
[ɪ]
[ɛ] friend
[ɪ] sieve
[ɪ] or [ə] kerchief,
mischief

OO [u]
[ʊ]
[ə] blood, flood
[o] door, floor

OW [o]
[aw]
[a] knowoledge

THREE OR MORE PRONUNCIATIONS

<p>C [k] [s] [ç] "E" words [ʃ] licorice, ocean, species, + "E" words</p>	<p>SS [s] [z] dessert, dessolve, possess, scissors [ʒ] issue, tissue, + "E" words</p>
<p>D [d] [t] chapped, mashed, touched, unwashed [θ] adorn, adjourn, adjust, grandma, grandpa, handsome, [ʃ] schedule, soldier</p>	<p>CH [ç] [k] [ʃ] chalet, chamois, champagne, chauffeur, chef, chute, crochet, machine, moustache, mustache, sachet [θ] yacht</p>
<p>G [g] [j] [θ] assign, campaign, champagne, cologne, design, ensign, foreign, gnat, gnaw, reign, resign, sign, [ʒ] rouge</p>	<p>NG [ŋ] [ŋg] N20, G12 words, N20, G31 words [nʃ] N10, G11 words [nʒ]* lingerie*</p>
<p>N [n] [ŋ] [θ] autumn, column, condemn hymn, solemn, monsieur [n] señor</p>	<p>A [æ] [e] [a] [ə] or [ɪ] [ɔ] [ɛ] [o] [θ] [ə] was, what</p>
<p>S [s] [z] [ʃ] catsup, insure, sugar, sure, + "E" words [ʒ] "E" words [θ] aisle, chamois, corps, isle</p>	<p>E [ɛ] [i] [ə] or [ɪ] [θ] [e] ballet, bouquet, buffet, cafe, chalet, crepe, crochet, croquet, fete, mesa, re, sachet, valet</p>
<p>T [t] [θ] [ç] natural, statue, + "E" words [ʃ] "i" words</p>	<p>[ɪ] or [U] pretty [e] or [ɛ] ere, where</p>

Three or more pronunciations (con't)

I [I]
[ay]
[ə] or [I]
[ə]
[y]
[Ø]
[i] antique, chili, chlorine,
fatigue, fiord, Hopi,
khaki, machine, marine,
mesquite, mi, mobile,
pizza, police, ravine,
sargine, ski, suite,
taxi, ti, unique,
vaccine, valise

O [a]
[o]
[ə]
[ɔ]
[Ø]
[ə] or [I]
[ɔ] or [a]
[a], [c] or [ɔ]
[u] do, improve, lose, move,
movie, prove, remove, to,
tomb, two, who, whom, whose
[U] wolf, woman, bosom
[wə] one, once
[I] women
[ə] colonel
[ə] or [u] or [Ø] toward

Y [ay]
[i]
[i] or [I]
[ə] martyr, myrrh
[ə] or [I] syrup

EA [i]
[ɔ]
[ə]
[c] break, great,
steak, yea
[a] heart, hearth
[ə] or [I] ocean, pageant,
sergeant, vengeance
(EAU [o] beau, bureau, plateau
[yu] beauty)

OU [aw]
[ə]
[(y)u]
[ɔ]
[o]
[U] could, should, would

U [(y)u]
[ə]
[Ø]
[ə] or [I]
[U]
[ɔ] bury
[I] business, busy
[w] jaguar, language,
penguin, persuade,
pueblo, suite
(EAU [o] beau, bureau, plateau
[yu] beauty)

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